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EDUCATIONAL FOUNDATIONS OF
TRADE AND INDUSTRY

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BY
FABIAN WARE
AUTHOR OF

"EDUCATIONAL REFORM—THE TASK OF THE BOARD OF EDUCATION," ETC.

" . . . and then as to her manner ; upon my word I think it is particularly graceful, considering she never had the least education . for you know her mother was a Welsh milliner and her father a sugar-baker at Bristol."

School for Scandal, act ii. sc. 2.



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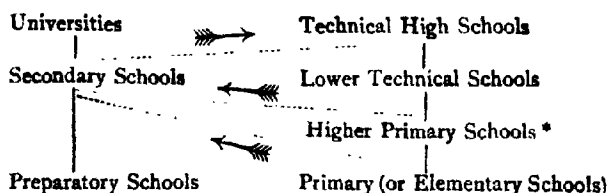
TO MY WIFE

P R E F A C E.

THE following pages have been written with the intention of placing before the English public an accurate, though necessarily far from complete, account of the educational foundations of foreign trade and industry. As need for educational reform is generally expressed in England in terms of foreign commercial or industrial success, I may be justified in thinking that many persons in this country will be interested to know, or to complete their knowledge of, what our foremost rivals are really doing in their schools. This book originated in a suggestion of Professor H. L. Withers, of Owens College, Manchester, that I should write on the subject of foreign trade and foreign education. I am not qualified to discuss the question from an industrial or commercial point of view; I have therefore confined my attempts to showing the educational intentions of Germany, France, and the United States of America, and the way in which these intentions are put into practice in

Preface.

their schools. The relation between their education and their success in commerce and industry is now generally recognized in England ; but it is not for an educationist to express any opinion on this matter. The following plan of a complete national system of education will explain most of the technical terms which I have been obliged to use in the following pages. The dotted lines and arrows show the principal passages from one division of the system to the other. The two divisions are distinct in most countries, the great exception being America.



The only direct assistance in my undertaking which I have to acknowledge is that of my wife. To her judgment and practical help I am greatly indebted, and to her I have dedicated my book.

I must, however, take this opportunity of publicly admitting how much I owe to the writings of Mr. Spenser Wilkinson and Mr. Michael E. Sadler. All students of National Education are under a heavy debt to these two gentlemen ; my obligation to them is particularly great, as I have had

* Called in England "Higher Grade Schools."

Preface.

many opportunities during recent years of discussing personally with them matters of common interest.

Among the chief works which I have consulted, and from which I have quoted, I may mention, "Special Reports on Educational Subjects" of the English Board of Education, the volumes published in connection with the Paris Exhibition of 1900 by the French Ministry of Public Instruction and Ministry of Commerce, the Annual Reports of the United States Commissioner of Education, and the admirable "Monographs on Education in the United States," published in connection with the American Educational Section of the Paris Exhibition of 1900.

F. W.

HAMPSTEAD,
June 8th, 1901.

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EDUCATIONAL FOUNDATIONS OF TRADE AND INDUSTRY.



CHAPTER I.

THE GROWTH OF NATIONAL SYSTEMS OF EDUCATION.

WHATEVER may be considered the most remarkable achievement of the nineteenth century, there can be little doubt that the national education systems which it has founded will be held responsible by future generations for much of the prosperity which they may enjoy, and many of the woes which they will suffer. It is true that, in all ages of civilization, much attention has been paid to the education of the ruling classes. From time to time charitable persons have endeavoured to extend the benefits of education to the children of the poor, and in England, at any rate, there has never been wanting a recognition of the right of the talented child to enter through the school into the aristocracy of intellect. But it was only during the

Universal Need of Education.

last century that the civilized world awoke to the full realization of the fact that no man is qualified to fill the position, however humble it may be, which his country has assigned to him without having been educated in the school ; that is to say, developed mentally, morally and physically, through a systematic course of instruction, to such a pitch as will enable him to contend successfully against the difficulties and complexities of modern life, not only those difficulties and complexities which enter into the common environment, but also those which he must encounter in his own special sphere of activity. The realization of this fact led to the creation of national systems of education, that is to say, systems which provide education for the whole people of a nation, not as if they were divided into distinct and independent classes, but, even where social barriers are most firmly established, as united in a common purpose, and possessed of common modes of thought and action.

It is no mere coincidence that the realization of this fact has originated with the commencement, and has kept pace with the growth, of that great industrial development which has undermined the foundations of the old social and economic order, and seems destined to work changes even in the physical aspect of our world. The marvellous scientific discoveries of the last century and of the closing years of its predecessor, which produced in

Results of Scientific Progress.

one direction the Industrial Revolution, gave us in another a deeper insight into the activities and possibilities of the human mind ; they threw such light on the workings of the human intelligence, and of the development of the human body, that laws were discovered for the training of both, which if they were not altogether unknown to our ancestors, had only been advanced hitherto in a timid and uncertain manner. New views were thus acquired as to the value and the power of education. For centuries, one might almost say since the moment when Greek civilization reached its zenith, the schools of Europe had devoted themselves almost exclusively to the training of scholars. Their one aim had become the pursuit of learning and the achievement of scholarly culture through contact with the thoughts and writings of the past. The interdependence of mind and soul and body, pointing to the concurrent training of this human trinity into a sound and fully developed living organism, capable of conquering the actual surroundings in the midst of which it had to exist, had been lost sight of, and was not restored to the world until rediscovered by modern science, and expressed in new formulas with added truth.

At the same time the Industrial Revolution brought with it the demand for increased knowledge on the part of those workers whose duty it was to control the new forces applied to industry. Neither

Destruction of Self-dependence.

must the changes which it introduced into the conditions of labour be ignored. New responsibilities were thrust upon nations with regard to that large class of workers, for whom the marvels of machinery meant but the destruction of independent work and the earning of a living by mechanical labour, subversive of that "self-dependent power" which Goldsmith rightly held to be the true source of a nation's strength, and the destruction of which from other causes he deplored even in his time. Every addition to labour-saving appliances confirmed the truth of Adam Smith's assertion as to the mental, moral, and physical effects of the progress of the division of labour on the majority of the population. In this progress, he said, "the employment of the far greater part of those who live by labour, that is, of the great body of the people, comes to be confined to a few very simple operations; frequently to one or two. . . . The man whose whole life is spent in performing a few simple operations, of which the effects too are perhaps always the same, or very nearly the same, has no occasion to exert his understanding, or to exercise his invention, in finding out expedients for removing difficulties which never occur. He naturally loses, therefore, the habit of such exertion, and generally becomes as stupid and ignorant as it is possible for a human creature to become. . . . His dexterity at his own particular trade seems, in

Effects of the Industrial Revolution—

this manner, to be acquired at the expense of his intellectual, social, and martial virtues. But in every improved and civilized society, this is the state into which the labouring poor, that is, the great body of the people, must necessarily fall, unless Government takes some pains to prevent it." And so deeply did the great economist feel the dangers to which the nation was thus exposed that, in spite of his objection to public institutions for education, he was convinced that Government alone could prevent these dangers by providing elementary instruction for the inferior ranks of the people. The poet Wordsworth expressed the same view some thirty-five years later in his "earnest wish expressed for a system of national education established universally by Government," in which he pleads that none be forced

" To drudge through weary life without the aid
Of intellectual implements and tools."

Such were some of the views expressed by men in our own land as to those tendencies which had to be counteracted by education, but which were confirmed by the new industrial development.

We may say, therefore, that the growth of national systems of education during the nineteenth century was due to two main causes. As we shall see later, these causes were not productive of as great effect in England as elsewhere ; but

And the New Conditions of Labour.

they were clearly perceived by those of our leading thinkers whose attention was not absorbed by problems which appeared at the time to be of a more pressing nature. Briefly, these two causes may be stated as follows. On the one hand, the new conditions of labour threatened the destruction of that "self-dependent power" which may be regarded as one of the chief sources of a nation's strength; secondly, the application of the new discoveries of science to industry necessitated greater intelligence and wider knowledge than had hitherto sufficed for those at the head of industrial undertakings. The first of these, it may at once be noted, points to the general education of all classes of the people; the second to the special education of those who, by fortune or by merit, rise to a position of greater responsibility than their fellows.

It may appear a somewhat remarkable fact that England, the birth-place of modern industry, is the last of the great nations to build up its educational system. The close of the eighteenth century saw public provision made for schools in Würtemberg, Saxony, and Prussia. The opening of the nineteenth witnessed the creation of a complete system of education of all grades in France, under the direction of Napoleon. It was not until 1870 that our parliament established elementary schools, insuring the primary education of all children in the land; and we are still to-day behind all other

Causes of England's Backwardness.

great nations in making public provision for the higher branches of education.

We often hear it said that this is due to the natural conservatism of the English character. If another country introduces changes which we hesitate to adopt, clinging apparently to the older order of things, there is certainly some justification for the statement that we are more conservative than the people of that country. But it is very necessary, in making such an assertion, to guard carefully against any confusion of cause and effect. Before the fact can be established beyond all doubt that the natural character of the English people is more conservative than that of another people, not only must the actual achievements of both peoples in every branch of activity be compared with minute accuracy, but due allowance must be made for the external influences which may have modified the natural action of their characters. Without plunging into the depths of such a very complicated question, we can, nevertheless, find a more immediate cause than the conservatism of the English character, for our failure to establish a national system of education as early as Germany and France.

By a national system is meant one which, among other things, meets all the varied needs of the nation, and is representative of a common national purpose. This common purpose can only be

Causes of England's Backwardness—

insured if the system is controlled—to what extent need not now be discussed—by the State. Before arriving at a definite conclusion as to the cause of our failure to establish such a system during the nineteenth century, we must, therefore, consider the nature of our government during this period.

In England the greater part of the last century has been occupied in remodelling our government on a democratic basis. In 1770, Burke voiced the determination of the English people to oppose any attempt to establish a government possessing despotic elements when he deplored the tendency shown by the House of Commons to exercise control *upon* the people, whereas "it was designed as a control *for* the people." These words may be regarded as marking the close of the defensive attitude of the democratic forces ; they were henceforth to assume an entirely offensive *rôle*, and for nearly three-quarters of the nineteenth century we were consciously occupied in the pursuits of that form of constitutional government, which would be thoroughly representative of all classes of the people, and would at the same time allow the greatest freedom possible to the individual. During this period our government was, therefore, in a stage of transition ; and at every moment the existing form, backed by the forces of conservatism, was fighting for its preservation rather than, with an

compared with Germany—

assurance of its permanency, attending to its legislative and executive duties. But unless government possess confidence in its own permanency, providing as it does a sense of stability, national action becomes impossible.

Even where democratic forces are at work, disintegrating the older forms of government, national unity, productive of national action, is, however, possible when internal differences are outweighed by common needs in face of external opposition. At the beginning of last century we were full of that national pride which, in the "Old World," according to Lowell, "feeds itself with the record of battles and conquest"; and, had this pride in our national achievements been coupled with the ever-present consciousness of the need of unity for defence against external interference, national action might have become possible without entirely checking the progress of constitutional reform. But when once the Napoleonic wars were terminated, the external opposition to Great Britain seemed to us to be reduced to a negligible quantity, and consequently national unity was not an imperative need. This explains our delay in establishing a national system of education.

Germany, however, spent the same period in uniting in the face of external opposition into one nation. Prussia, crushed under the iron heel of Napoleon, rose again with a vigour and a

And with France.

determination which, by their strength, ultimately drew the other States into a united Empire, over which she presided. One of the first results of her revival was the establishment of a national system of education to which the systems of the other States have now closely assimilated themselves. Germany has never allowed democratic aspirations to interfere with that national unity which external opposition rendered essential.

France, on the other hand, has, during this period, suffered many vicissitudes. At least five times she has radically changed her form of government. But for the very reason that these changes were revolutionary and unforeseen, each successive form of government possessed stability owing to the fact that the people believed in its permanency. There was not, at any rate in France, that certainty of change which was always with us in our conscious evolution towards democracy. And not only so; whatever may have been the disintegrating forces at work under the different forms of government, national unity, productive of national action, was ever necessary—though at moments this necessity may have been lost sight of to the disadvantage of France. Consequently the national system of education founded by Napoleon was continued and developed. It is true that it was modified from time to time in favour of that class of the people on which the existing

Democracy established in England.

form of government depended for support ; but events invariably restored the national aim.

Viewed in the light of these facts, it is a bold assertion to say that it is owing to a greater conservatism of character that we have failed to found a national system of education at as early a date as Germany and France. And, whatever may be the characteristic want of foresight of which we are accused by some of our best friends, it is to our credit that we perceived that, in the circumstances in which we were placed, the constitutional struggle had to be decided before our government would be justified in taking any measures of a permanent and far-reaching effect. It was not until the Act of 1867 had settled, once and for all, that our government should assume the democratic type that sufficient stability in the form of government was acquired to allow a system of education to be imposed on the people. And even then it was not a national system ; for the Act of 1870 dealt with elementary education alone. In a sense this Act was a democratic measure ; and in this connection it is interesting to notice that the Government did not venture to compel the people to send their children to the elementary school, preferring to leave the question of compulsion to the Local Authorities—the School Boards—to decide. There was thus initiated, under the new form of government, that policy of allowing the English people

Democracy and Education in America.

even greater freedom of educational control than was insured by a thoroughly representative form of central or national government.

At this point, while considering democratic as opposed to national tendencies in the organization of education, our thoughts naturally turn to the United States of America. Daniel Webster, in his Plymouth oration of 1822, remarked : " On the diffusion of education among the people rests the preservation and perpetuation of our free institutions. I apprehend no danger to our country from a foreign foe. . . . Our destruction, should it come at all, will be from another quarter. From the inattention of the people to the concerns of the Government, from their carelessness and negligence, I confess I do apprehend some danger. I fear that they may place too implicit confidence in their public servants, and fail properly to scrutinize their conduct ; that in this way they may be the dupes of designing men and become the instruments of their undoing. . . . Make them intelligent and they will be vigilant ; give them the means of detecting the wrong and they will apply the remedy." This perception of the need of education to ensure the success of democracy when once firmly established is not strange. In commenting on these words of Daniel Webster, one of the leading educators of America recently observed : " We are making the experiment of self-government—

Democracy and Education in America.

a government of the people by the people—and it has seemed a logical conclusion to all nations of all times that the rulers of the people should have the best education attainable. Then, of course, it follows that the entire people of a democracy should be educated, for they are the rulers." With this it is interesting to compare the opinion expressed by Robert Lowe. After the passing of the Reform Act of 1867, by which the working-men living in small houses and forming a majority of the population were enfranchised, he exclaimed, "We must now at least educate our new masters."

The original absence, in the education of the United States, of a national aim—of the kind which is forced upon a people by external opposition—is clearly shown by Daniel Webster's proud boast: "I apprehend no danger to our country from a foreign foe." Well might Englishmen have uttered the same boast after the battle of Waterloo; but fifty years of internal struggles were necessary before we arrived at Webster's views as to the need of education for the people. How far democracy has proved itself capable in America of building up a national system of education will be shown in a subsequent chapter. It will then be seen that in possessing such a system the United States also have stolen a march upon us.

CHAPTER II.

VOLUNTARY EFFORTS IN ENGLAND TO LAY EDUCATIONAL FOUNDATIONS.

OF the three countries which we have considered, it is seen that England has been the last to recognize the responsibility of the nation in face of the new conditions of labour, threatening the destruction of "self-dependent power"—the responsibility, that is to say, of counteracting by education the deadening influences of mechanical labour for those whose fate it is to earn their living among the lowest ranks of the workers. And when England did at last recognize this responsibility it was on account of the establishment of democracy, demanding, as this form of government must demand, a certain minimum of enlightenment on the part of all those who have a share in the government. There were many men in England who, even then, would rather have adopted Adam Smith's view, and admitted the claims of education on the grounds that "in free countries, where the safety

Want of National Aim in England.

of government depends very much on the favourable judgment which the people may form of its conduct," it is an advantage to the State that the people be instructed, for then "they are more disposed to examine, and more capable of seeing through, the interested complaints of faction and sedition." Generally speaking, however, it may be said that we were ultimately guided by the same democratic motives as the Americans, and, to a certain extent, the French ; but we were in no way convinced, as the French and Germans were, and still are, of the dependence of national prosperity on national education. We were not urged, and have not yet been compelled, to found a national system of education by the second of the two causes named above : the need, in international competition, of greater intelligence and wider knowledge on the part of those of our people who have to control the new forces introduced into industry by the discoveries of science.

But the absence of a national system does not imply the total want in the country of means of meeting national needs ; though it does necessarily represent an incomplete and disorganized provision for such needs. For instance, great voluntary efforts had been made in England to bring elementary education within the reach of all classes of the people before the interference of the State in 1870. In the same way, though on a

Dr. Birkbeck's Efforts—

much smaller scale, something had been done by voluntary effort to increase the intelligence and knowledge of those who had to control the new forces which science had brought to bear upon industry.

The pioneer in this movement was Dr. George Birkbeck. The son of Quaker parents, he was born in Yorkshire, in 1776. When a student at Edinburgh University he formed a friendship with several men destined to become eminent, among whom may be noticed particularly Henry Brougham. While engaged as professor of Natural and Experimental Philosophy at the Andersonian Institution in Glasgow, Birkbeck was obliged to employ ordinary workmen to make his scientific apparatus, for there was no specialist in this branch of work in the town. On one occasion he employed a tinman to construct a model of a centrifugal pump. It was in the cellar which was the tinman's workshop that, surrounded by the workmen who were making the pump, he was struck with their ignorance as to its uses, and at the same time with their desire to obtain enlightenment. It was here that he first conceived the idea of giving a course of gratuitous lectures for the scientific instruction of the working classes. In the programme for this course which he drew up shortly after, he announced his intention of establishing classes "solely for persons engaged in the practical exercise of the mechanical arts, men whose

Philanthropic in Intention—

education early in life had precluded even the possibility of acquiring the smallest portion of scientific knowledge." And he added that "greater satisfaction in the execution of machinery must be experienced when the uses to which it may be applied, and the principles upon which it operates, are well understood, than when the manual part alone is known, the artist remaining entirely ignorant of everything besides."

As may be judged from the words just quoted, Dr. Birkbeck's object was excellent ; but he failed, as many a philanthropist fails, owing to a very natural impatience to achieve his end. It is this impatience that so often causes the philanthropist to attempt to circumvent the laws of progress which are inflexible in their insistence on a slow and gradual process of evolution—laws which can least of all be violated in education.

We have seen earlier in the preceding pages that the industrial revolution made it necessary that education should provide increased knowledge among those workers who had to control the new forces which scientific discoveries had introduced into the processes of manufacture ; and, above all, that education should counteract the evils arising from the destruction of self-dependent power among those workmen for whom these improvements meant but the earning of a living by

But doomed to Failure—

mechanical labour, offering no stimulus to healthy physical or mental development. And it was stated that these two needs pointed respectively to the general education of all classes of workers, and to the special education of those who, by fortune or merit, rise to a position of greater responsibility than their fellows. As the distinction here drawn has continually been ignored in England, and as it really affects the very basis of a national system of education, it demands particular attention.

Dr. Birkbeck appears to have attached chief importance to the need of workmen to understand the uses to which machinery may be applied, and the principles upon which it operates. To teach them this, he offered a course of lectures, in which he promised that he would study "simplicity of expression and familiarity of illustration." In other words, he attempted to teach science in such a way that its principles could be grasped by persons who had had no preparatory education—who were, in fact, entirely ignorant. In criticizing the somewhat narrow aim which he placed before himself, due account must be made for the spirit of the times in which he lived. The great efforts of Bell and Lancaster—of the National Society for the Education of the Poor in the Principles of the Established Church, and the British and Foreign School Society, which sprang respectively from

for want of a Proper Foundation.

the work of these two pioneers, had not had time to produce important results when Birkbeck started his classes. Moreover, the nation had at that time no general appreciation of its moral obligation as to the education of the people; and the government being in the hands of the upper classes, there were no such motives to provide schools for the lower classes as those which produced the Act of 1870, when they had become the "masters." So that whatever may be said of Birkbeck's aim, it had, at least, the merit of placing before the country a very practical object to be attained by the instruction of the working-classes. But as we look back on his work after the event, and with our greater educational knowledge, gained from practice as well as supported by modern theory, we are ready to prophesy its failure; knowing, as we do, that the elementary principles of science cannot be acquired by those who have had no preliminary intellectual training, who possess no elementary knowledge, and who are for the most part unable to read, and are ignorant of the rudimentary principles of arithmetic. So that we are prepared to say that Birkbeck was neither giving special training to those who would have themselves to apply the discoveries of science to industry, nor was he attempting to give that kind of education which was best calculated to counteract the deadening and mechanical

Diffusion of Useful Knowledge.

influences of constant contact with the monotony of machinery.

To excite interest in machinery itself may indeed have been one means of counteracting these influences; but even if such interest could be maintained, without that basis of education which can alone provide a foundation for a progressive study of the principles of science, this means can only affect one side of the question. The views of those who shared Birkbeck's opinion are well carried out in Brougham's discourse "On the Objects, Pleasures, and Advantages of Science," one of the first publications of the "Society for the Diffusion of Useful Knowledge," founded in 1827. As we now read this discourse, explaining as it does with "simplicity of expression and familiarity of illustration," such matters as the method of logarithms, the different mathematical curves, the laws of motion, the principles of astronomy, optics, and electricity—in fact, resuming in summary all that was then known in science—we must feel that the uneducated workman may, on first reading this discourse, have been interested in all the marvels displayed before his eyes; but he must speedily have discovered that he was unable to pursue their study with any chance of fathoming their mysteries, and he must have been reduced to that state, with regard to which it may truly be said, a little knowledge is a dangerous thing.

Mechanics' Institutions—

Birkbeck's classes at the Andersonian Institution offered all the appearances of success at the outset. The first of his lectures was attended by seventy-five persons; the second, by two hundred; at the third, more than three hundred workmen were present; and at the fourth, above five hundred. He soon turned his attention to England, with no less success. Between 1815 and 1825, Mechanics' Institutions were founded in all parts of the land. In the year 1841, in which Birkbeck died, there were no less than two hundred and twenty of these Institutions, about thirty-six of which were in London and the suburbs. A large number of these failed to achieve the object for which they were created. Sir Philip Magnus, in a lecture which he delivered at the Cambridge Summer Meeting of 1900, summarized their history in the following words:—"The history of most of these institutions is very similar. Some of them, such as the institutes of Manchester, Huddersfield, and Leeds, kept alive long enough to be converted into Technical Schools. Others, however, led a languishing existence, and degenerated into clubs, or changed the character of their work, or ceased to exist. Very few succeeded to the extent expected by their founders, and yet their failure was in no way due to any fault in their conception nor in their objects. It was due, in the first place, to the want of adequate funds, and secondly, and equally, to

Their Failure—

the absence among the workmen, whom they were intended to benefit, of the rudiments of primary education."

From the failure of the Mechanics' Institutions, we may learn another lesson. It teaches us the impossibility of building up any general system of education without looking far ahead into the future, and foreseeing the ultimate meeting and harmony of efforts starting from points widely apart in the present. Birkbeck wished to teach his uneducated workmen the scientific principles underlying the construction of the new machinery and the processes of manufacture with which they had to deal. The benevolent and philanthropic can never contemplate with resignation the inexorable laws of nature, which condemn a large number of individuals to the backwaters of the stream of progress; and in the struggle which they wage against these laws they not infrequently neglect the opportunities for promoting in the surest and most natural way the future development of mankind. The education of ignorant adults can at best be regarded as a benevolent palliative for existing wrongs. That the workmen in Birkbeck's time were ignorant and incapable of appreciating the application of the discoveries of science to the processes of manufacture undoubtedly exposed the nation's neglect of its own interests, and of its duty to the lower classes, on whose labour its

and its Causes.

very existence depended. But the only way of remedying this, so as to ensure the future prosperity of the nation, was by educating the rising generation.

Some educational philanthropists are, however, like the man in the fable, who was in charge of a lighthouse, and who gave to the people, starving in the huts around it, the oil from the lamps, with the result that the ships which were bringing them food were wrecked on the rocks for want of a guiding light. Such philanthropists are too prone to use the resources at their command as palliatives of present distress rather than as safeguards against future disaster. Others, again, are anxious to gather the ripe fruits of their work in their lifetime, and to this end promote growth by artificial means, which are bound ultimately to destroy by their unnatural strain the very sources of productiveness. It may, indeed, be said that in the beginning of the nineteenth century many voluntary efforts, and, as we shall see later on, a number of the efforts of the State as well, took the form of a series of experiments, one after the other of which proved abortive, to arrive at a given educational end by a shorter route than that which conforms to the directions of nature.

For reasons which have already been pointed out, the nation, as represented by the central government, has never, during the last century,

Educational Needs of Industrial Classes.

seriously thought out the whole question of a national system of education as Germany and France have done. Otherwise the failure of Birkbeck's experiment would have led them immediately to provide proper elementary education for the working-classes. This, as we have seen, was not done until 1870. In the mean time, however, the great efforts of the National and the British and Foreign Society had been doing all that voluntary effort could do to provide elementary education for the children of the poor. Thus, when the State first interfered in the special interests of the education of the industrial workers, there was some sort of foundation on which it might build. It was, therefore, able to start its work under more favourable conditions than those which Dr. Birkbeck had to face. But, before considering this work of the State, we must refer again for one moment to the two classes of persons who were chiefly affected by the application of the discoveries of science to the processes of manufacture.

In the first place, as we have already remarked, there were those who were destined to continue among the lower ranks of mechanics, and who were thus affected by the destruction in great measure of their independence. For them, education in its broadest sense was necessary ; an education of which the first duty was to counteract the mental,

Educational Needs of Industrial Classes.

moral, and physical evils of the new conditions of labour ; in short, what is generally understood by elementary education. If these people could complete their elementary education by some instruction in the principles of science, so much the better. But for them, the first thing essential was not a knowledge of the principles of science, to say nothing of the fact that such a knowledge cannot be acquired, as was proved by the failure of Dr. Birkbeck's experiment, without the preliminary training afforded by the elementary school.

But, in the second place, there was that class of persons who would be called upon to control the new forces introduced into industry. This class may be divided roughly into two divisions : those who, in their capacity of masters or managers, are the leaders of industry, and the heads of great enterprises, and those who occupy a position corresponding to that of a foreman. The knowledge required by the former is evidently much greater than that necessary for the latter. In fact, while the leaders must have had the best scientific training possible, and have mastered all the higher branches of science bearing on the manufacture or industry with which they will be concerned, the latter cannot be expected to afford that expenditure in time and money demanded by so arduous a course of studies. It is certainly more difficult to decide what should be the education of the

Educational Needs of Industrial Classes.

latter class than what kind is best suited to the requirements of the former.

It is the custom to select a foreman from the best of the workmen, in much the same way as a noncommissioned officer is selected in the army. His position is not always one which requires superior knowledge so much as a certain natural talent for managing and directing his fellows. If, therefore, it is essential that he should rise from the ranks, it is difficult to see how he is to be provided at the outset with a better education than the ordinary workman. If opportunities are within his reach for continuing his education in his spare time, after he has begun to earn his living, he will be sure to take advantage of them if he intends to rise. His need of special knowledge beyond that of the ordinary workman is so slight that it can hardly be worth the nation's while to provide special day-schools, directly in continuation of the elementary school, to complete his education. And, it is hardly necessary to add, no education will ever bestow the qualities of command.

It must be remembered that it is to the nation's interest to give every opportunity to talent to reach its natural high-water mark; there is certainly no reason, or at any rate, no justification, for its spending money in checking the rise of talent by premature specialization. In this

The Preservation of Talent.

connection the fact is sometimes overlooked that, although the science of education is still very largely based on hypotheses which have not been finally proved, it is beyond doubt that the process of education must conform to the course of the pupil's natural development. Starting from a broad basis, it gradually narrows its limits until, to use, for the sake of illustration, a geometrical figure, it closes in upon, and finally proceeds along, a line of specialization, naturally selected by the pupil. It generally happens that the greater the talent, the longer is the point of specialization delayed; and consequently the broader is the sphere of general culture which the course of development embraces. If education can have any effect whatever on this development—and that it has a very great effect can hardly be denied—it can certainly stunt it by forcing a pupil to specialize before he has selected his natural line. And, if existing social and economic conditions make it impossible for all talented children of the poorer classes to receive the highest education for which they are fitted, we can at least bring some redress by refusing to sanction any attempt to kill talent by an artificial stunting of natural development through education; we can at least offer a broad, general elementary education for the child who is compelled to earn his living at the age of thirteen or fourteen, and allow him to continue this

The Preservation of Talent.

education in the evening school according to his natural taste. To attempt to supplement his elementary education by a course of specialized training, extending over two or three years, so as to fit him for the duties of a foreman, is morally wrong, a financial extravagance, and will incur an ultimate loss of talent to the nation.

How this has been done in France as a check on social aspirations will be seen in a later chapter; in England, with our present social organization, such a check is unnecessary. If any education higher than elementary is to be provided for those children who can afford to stay at school until the age of sixteen, but not later, it should be of such a kind as will promote and not retard the general development of talented pupils. The technical day school for children between the ages of thirteen and sixteen has, therefore, no place in a system of national education which is built up with due regard to natural laws and national economy. And yet the English Government attempted to provide such schools alone, when it did at last begin to consider the educational foundations of trade and industry.

CHAPTER III.

THE ATTEMPTS OF THE ENGLISH GOVERNMENT TO LAY EDUCATIONAL FOUNDATIONS.

WHEN the struggle between oligarchy and democracy was at its height, an event happened which warned the English people of the existence of other nations competing with them in trade and industry. In 1851 the first International Exhibition was held in Hyde Park. To this exhibition foreign countries brought the products of their industry, and we were able to compare them with our own. The effect of this comparison seems to have been to warn us that the taste and training of our manufacturers was sadly deficient. Owing to the influence of the Prince Consort—who, when all is known, will probably be found to have seen deeper into our educational needs than any one else of his time—the profits from this Exhibition, amounting to £186,436, together with a parliamentary grant of £150,000, were devoted to the purchase of land in South Kensington. The Prince Consort, in a letter

The International Exhibition of 1851.

to Lord Playfair, propounded, in connection with the use to which this land should be put, a scheme of "instruction for those engaged in the prosecution of arts and manufactures." As a direct consequence of his efforts, the Science and Art Department was formally established in 1853. This does not, however, represent the first recognition by the State of its duties with regard to the education of the industrial classes. In 1837 the Committee of Trade (now known as the Board of Trade) extorted a sum of £1500 from the Treasury for the creation of a central Government School of Design, and in 1841 provincial schools of design were started with the aid of Government grants.

To the influence of the Prince Consort is due the gathering together and focussing at South Kensington of the scattered forces then existing,* so that one department of the Government might be able to control all industrial education. This was the result of the warning to the nation as to foreign competition sounded by the International Exhibition of 1851. That this warning did not bring about the establishment of a national system of education, in which the Government controlled or supervised schools of all types, was due, as we have

* Note also the foundation of the Royal College of Science under a different title in 1851. It was not, however, until more than twenty years later that this institution was transferred to South Kensington.

Creation of Science and Art Department.

already seen, to the fact that the people had not yet carried out that change in the form of government on which they were bent. Until this change was accomplished, the Government could not command their confidence, and thus itself acquire that sense of permanency without which it could not attempt to adopt a consistent and far-reaching policy.

The Science and Art Department was created to control and organize industrial education. Before we consider the work which it has done in England, it is necessary to have some idea of the difficulties which it had to face at the outset. Dr. Birkbeck's experiment had proved—for those to whom it needed proving—the impossibility of imparting scientific knowledge to adults who had received no general elementary education. The Science and Art Department, therefore, recognized that elementary education must form the foundation of its work. Not only was all such education, however, provided at that time by voluntary effort, but it was not until three years later that the Education Department was appointed to exercise some sort of State supervision over these efforts. And so hopelessly did the voluntary schools fail to meet the national demand that, even in 1870, when the great Education Act was passed, it was discovered that although in London, with an estimated population of 3,258,000, there were, according to the

State of Elementary Education.

Government's method of calculating, 543,000 children requiring education, there was actually accommodation for 373,314 only. Further, when the Government inspectors came to investigate this accommodation, they discovered that it only provided for 275,136 children in *efficient* schools. From this it may be judged what was the state of affairs over the whole of England ; and it must be remembered that these figures represent what was being done nearly twenty years after the creation of the Science and Art Department, although the interval had witnessed extraordinary efforts on the part of voluntary societies to make proper provision for elementary education in England. What chance had a Government Office to build up a system of education on such a foundation as this ?

In 1856, when the Education Department was created, it seems to have occurred to the Government that it would be advantageous to the education of the working-classes if the State control of all their schools were centred in one body. Consequently the Science and Art Department was removed from the Board of Trade to the new Education Department, which thus included branches for the control of primary as well as industrial education. After the Act of 1870, when the primary branch had received a mandate from the people to insist on the provision of primary schools in sufficient number to meet all national

Blunder of Government.

needs, there must have appeared to the educational enthusiast of the day a very excellent chance for the two united branches to build up a national system of education—in so far as the lower working-classes were concerned. But in 1884 the Science and Art Department was separated from the primary branch, which was henceforth known by the distinctive appellation of the Education Department. This was, undoubtedly, a great mistake, and shows how far the Government still was from any idea of a national system of education. The quite unnecessary rivalry, which was thus created between these two branches, led to much extravagance and much waste of energy ; indeed, it took a good many years for the Education Department to wrest from the Science and Art Department certain powers over primary schools which it had acquired.

If other countries had made the same blunders, we might feel inclined to say that only experience can prove that it is impossible, by starting from the bottom and ignoring all that is actually being done in the higher spheres, to build up a national system of education, or even a satisfactory system for the working-classes. But other countries have not made the same blunders, a fact which such authorities as Matthew Arnold never ceased to point out. When reporting in 1886 on elementary education in Germany, Switzerland, and France,

Matthew Arnold's Warning.

Matthew Arnold closed with these memorable words—

“And this brings me, thirdly and finally, to the point raised at the end of my first remark, and urged by me so often and so vainly ever since my mission abroad in 1859; our need to *organize our secondary instruction*. This is desirable in the interest of our higher and secondary instruction, of course, principally; but it is desirable, I may say it is indispensable, in the interest of our popular instruction also. Every one now admits that popular instruction is a matter for public institution and supervision; but so long as public institution and supervision stop there, and no contact and correlation are established between our popular instruction and the instruction above it, so long the condition of our popular instruction itself will and must be unsatisfactory.”

It seems, however, to have been decreed that only the experience of failure should bring home this apparently self-evident truth to the minds of the English people. The disastrous effects of attempting to build up an educational system, while ignoring what was being done in higher spheres, soon made themselves felt. An educational system, like most other things possessing vitality, has a tendency to grow upwards. The primary school naturally presses up into the secondary sphere, and the secondary school into the university sphere.

Secondary Schools and Universities.

If each of these higher spheres present insuperable obstacles to the natural growth of these schools, the lower branches of the system will be diverted from their natural course and develop along a line of their own. We have only to look at the proceedings of nature on all sides to perceive that this is a general law governing the course of all progressive forces. The chief aim of human economy is to assist all forces to attain their ultimate aim with the least waste of energy, and, therefore, to derive from them the maximum of benefit. This is generally achieved by the removal of obstacles and the lessening of friction—in other words, by organization. Before coming to any conclusion as to how this organization can best be carried out so as to meet the needs of our industrial and commercial classes, the conditions which have characterized the development of our higher educational system in the past must be taken into account.

At the beginning of the nineteenth century there was in England only one kind of education at the disposal of those who were in so fortunate a position as not to be obliged to place any limit on the expense or duration of their school career. Our secondary schools and universities alike provided a classical course of studies alone. Their object was, and for long had been, to educate gentlemen and scholars. If the gentleman had the

Education of Gentlemen and Scholars.

makings of a scholar in him, so much the better ; if not, his education was conducted on the lines which it had followed since the days of the Renaissance. Skill in various sports, and some acquaintance with classical languages and literatures, were considered indispensable to his culture. Such an education cost money, and, fortunately or unfortunately, proved a great attraction in the days of sharp social distinctions to any man who, having risen through trade to a position of wealth, found himself able to procure it for his sons. At the beginning of the century, however, obstacles were thrown in the way of all Nonconformists, practically precluding them from this education, and it was not until after a hard fight that their disabilities at the universities were removed. So that, in the early days of the industrial revolution, a very large number of our manufacturers and commercial men regarded the traditional education of an English gentleman as something associated with a religious faith which they abhorred. But once the disabilities were removed we find that such men were quick to avail themselves of their new privileges, and that the attendance of their sons at the universities rapidly increased.

As every gentleman who did not enter the Navy or Army considered residence at a university as an essential part of his preparation for life, our universities were obliged to provide education for

Classical Education.

men with brains and men with a very ordinary mental capacity, two classes which are, on the whole, fairly represented to-day at Oxford and Cambridge by what are popularly known as Honours men and Pass men. The man without brains was not educated in a different way to the man who was fortunate enough to possess them—the difference was one of quantity rather than of quality or method. All received a classical education which, in those days, when the horizon of knowledge was infinitely more restricted than at present, was all that was considered worthy of the scholar. And our secondary schools prepared for the universities, and were supposed to offer but a more elementary course of the same classical studies.

So long had classics held undisputed sway of the field, that teachers had arrived at peculiar skill in adapting what now seems to us the limited material at their disposal to the demands of education. So carefully had they thought out the particular mental training which was provided by the different sections of these studies, that it must have been exceedingly difficult for them to find a place for new instruments of culture in their complete schemes, without destroying the whole balance of the education which they furnished. This explains their not unnatural opposition to the new branches of learning, which rushed into

Conservatism of Universities.

the field of human knowledge following the rapid discoveries of science. Moreover, it must be remembered that the idea of utility had never entered into their calculations. Having only to consider the needs of scholars, whose first object was not merely to earn a living, and of those gentlemen who could not hope to rise to the intellectual heights of scholars, but who rarely had to look forward to the necessity of gaining their own livelihood, it had never occurred to teachers and professors that it was part of their duty to prepare students to meet the more practical demands of life. Had they been obliged to do so we might not now be behind other nations in the education which we offer to our industrial leaders.

It is exceedingly important, in view of the present difficulties which we experience in organizing our educational system, to recognize at the outset these two objections on the part of the universities to the introduction of new studies into their curricula. For we find to-day that the scholar is too often not less conservative and not less prejudiced against any departure from tradition than those who base their claims to social superiority—and it may even be to political preferment—on their inheritance from the past rather than on their own personal merit. This, coupled with the not unnatural dread of upsetting a carefully balanced scheme of studies, perfected by three

German Universities and National Life.

hundred years of experience, is at root the cause of the strife which is waged hardly less bitterly to-day between classical and modern studies.

There was only one thing which could have forced the universities to widen their course of studies so as to keep pace with the marvellous scientific progress of the first half of the century. Had there been any strong external opposition, such as we have seen would have compelled the people to build up a national system of education, the universities might have been led to consider what they could do through education to assist the nation in its struggle. But, as we have seen, this did not exist, and the country was busy with internal reforms, with which conservative universities could, as a whole, have but little sympathy. Indeed, generally speaking, it may be said that in England the university authorities have never taken that interest in the affairs of the nation which is to be found in those countries where the national instincts have been aroused by the shock of foreign opposition. In Germany, for instance, the university professor is ever watching the trend of national affairs, and is always considering how his work can best be made to serve the national cause. He is not a mere scholar, cut off by the walls of his cloisters from the great movements which are disturbing and trying the strength of the people outside. There are, certainly, disadvantages

Scientific Education.

in allowing the teaching world to be affected by political influences. But nobody who has had an opportunity of comparing the German universities with our own can deny that there is a very distinct advantage when professors, and all those who determine the destinies of universities, are imbued with a keen sense of the importance of the various forces on which national welfare depends. None of these forces are to be despised, even if they are directed towards the promotion of occupations from which by tradition the upper classes held aloof. Indeed, it is owing entirely to Germany's national difficulties, as we shall see later on, that an educational policy arose which opened a path by which talent in all ranks of society might attain to the highest culture, and which endeavoured to provide the kind of school most suitable as a preparation for the different classes of occupations. It is not until the German nation had established itself firmly, and that the dread of foreign attacks was diminished, that we find social prejudices as to the different courses of instruction again in evidence.

It was not until 1851 that an honours examination in natural science was created at Cambridge. Two years later Oxford followed the example of Cambridge. We may take these dates as marking the first serious attempt in England to place science on a level with the classical languages as

Utilitarianism and Idealism.

a subject of instruction and a means of intellectual discipline. Thus, at last, was some special opportunity given to the leaders of industry to acquire that theoretical knowledge of scientific principles which was necessitated by the revolution which had taken place in the processes of manufacture. The secondary schools were naturally followed by the universities; but the modernizing of these curricula was only carried out in accordance with the proportion existing between the classical and science scholarships offered by the universities.

The director of a German technical school, which played a leading part in the development of technical education in his country, has remarked: "Technical education designed exclusively to meet the demands of a special occupation would isolate the technicist from civic life by which he is surrounded, and would alienate him from the ideal interests of society." So prevalent has this view been in Germany, that great emphasis has always been laid on the acquisition of general culture in the technical high schools. These institutions have indeed adopted the highest educational aims of the university; and so far have they succeeded, that in some cases candidates for the teaching profession in secondary schools are allowed by the authorities to prepare in them to teach mathematics and natural science.

It can hardly be denied that our leaders in

Utilitarianism and Idealism.

commerce and industry can as ill afford to be strangers to the ideals of the human race as other members of society. The development of our technical schools in England, and, it may be said, of all the special education of our industrial classes, has so far been dominated by that spirit of realism which owes its power in this country to the hopes that were raised in the human mind by the dawn of the great age of scientific discovery. There have not been wanting in all countries philosophers to preach the advent in the near future of such discoveries as would enable us to explain the motive of all human action. With the new example of machinery ever before their eyes, conforming with mathematical precision to certain inexorable laws of force, people readily believed that all mysteries would soon be explained, and that human action, in its individual, social, and international aspects, must also conform to certain fixed laws which ignored the eccentricities of idealism. Such laws, it was hoped, would remove all need of the controlling influence of those mysterious aspirations on which have been based in the past the distinction between right and wrong. According to an eminent contemporary Frenchman,* the return to idealism is a consequence of the bankruptcy of science; for those of us who

* M. Ferdinand Brunetière. Cf. "La Renaissance de l'Idéalisme." 1896.

Utilitarianism and Idealism.

have not, as he has, an extreme cause to defend, it is rather due to the return of the human mind to a normal temperature, after the feverish excitement of the years in which science first placed super-human forces under the control of man. The old moral code has again resumed that supremacy from which the doctrine of self-interest had for a short time ousted it. All but a few sturdy unbelievers now recognize that society depends for its existence on the cohesive force supplied by the old moral and æsthetic aspirations.

The doctrine of self-interest found a congenial atmosphere in the England of the latter half of the nineteenth century. The stern struggle for individual liberty against the stubbornly yielding forces of conservatism, tends to throw men back upon their own individual resources, and to lead them to believe that individual interests offer the highest aim to human wishes. On the other hand, history teaches us that, where ideals are strongest—not necessarily the highest—nationalism is most potent. And, in a certain sense, the converse is also true. Where we find unity forced upon a nation in face of external opposition, there we also find idealism prevailing over realistic doctrines. A contemporary author, who has probably done more than any one else to reawaken the sentiment of nationhood in England, has remarked:—

“Prussia deserved the position at the head of

“True Hearts and Clear Heads.”

Germany which she won in 1866, and maintained in 1870. It had been her peculiar distinction that, in the days of her misfortunes, . . . her patriots sought and found the path of national regeneration. They thought that the way to make Germany a great nation was to create in the Germans the qualities that produce national greatness. True hearts and clear heads were the great requisite.” . . .*

In industrial England, the tendency has been to consider in our education clear heads alone. A consequence of this one-sided striving after a sharpening of the individual intellect, has been a neglect of due attention to those common ideals which constitute the basis of national life. The philosophical reasons here suggested may explain the rise of that utilitarian spirit which has led to premature specialization in education. A more immediate cause may be found in the political conditions to which we have already referred.

The Exhibition of 1851 did, indeed, open the eyes of the people to the need of the better education of our industrial classes. On the advice of the Prince Consort, the Society of Arts organized a series of lectures on the results of the Exhibition. Mr. (afterwards Lord) Playfair delivered one of these lectures on “The Chemical Principles involved in the Manufactures of the Exhibition as indicating the Necessity of Industrial Instruction.”

* Mr. Spenser Wilkinson, “The Great Alternative,” p. 72. 1894.

“The Horses or the Harness.”

In this lecture he insisted on the fact that “it is abstract and not practical Science that is the life and soul of Industry.” And from many passages which are well worth reading to-day, the following may be quoted in continuation of the foregoing assertion :—“The cultivators of abstract Science, the searchers after truth, for eternal truth’s own sake, are—to borrow a simile, I believe, of Canning—the horses of the chariot of industry ; those who usefully apply the truths, are the harness by which the motion is communicated to the chariot. But is the chariot drawn by the horses or the harness ? Truth to say, in this country of ours—and, mark you well, in no other country in Europe—we honour the harness, but neglect the horses. . . . The cause would appear to be that we chiefly honour those who are useful in our time and generation ; that our eyes are too eagerly bent upon the golden prize, for which we are all running ; and that we can only afford to throw a kind of theoretical squint of recognition on those men who are looking for sublime truths, careless as to whether they will have any immediate effect on industrial progress. And yet it is these very men that give strength to the sinews of a future generation, enabling it to keep its place in the industrial struggle of nations.” These words were spoken fifty years ago, and since then the nation has learned to appreciate at their true value our

“Bricks without Straw.”

greatest men of science ; but we have not yet learned the need of the highest kind of scientific training for our leaders of industry. To continue the above simile : we now feed the horses, but we pay little attention to the quality of the harness.

The Science and Art Department, when it began its work as the official organizer and controller of industrial education, experienced, in a higher sphere, precisely the same difficulties as led to the failure of Dr. Birkbeck's efforts. This would have been foreseen by the Government—as it was foreseen by all thoughtful men of the period—if external opposition had obliged the people to consider the whole question of education from a general national point of view. But, as we have seen, this was not the case ; and the Science and Art Department was commissioned by the State to do the best it could to build up an important part of the national system on insecure foundations. The Government of Egypt, when it set the children of Israel the task of making bricks without straw, did so with a distinct purpose, in that it wished to increase their burden by throwing upon them the responsibility of finding straw for themselves. Our Government threw the same responsibility upon the Science and Art Department, but it did it in ignorance of the fact that straw was necessary for its bricks. The Department consequently spent a great part

Government and Secondary Education.

of its time and energies in an attempt to find straw, and has only succeeded in the making of bricks when, like the children of Israel, it has used stubble in its stead.

When once, by the Act of 1870, the Science and Art Department was at last furnished with a proper basis of elementary education, it still found that the secondary schools provided little more than the old-fashioned and one-sided classical education. The persistence of these schools* in maintaining this type of education has unfortunately strengthened the hand of those who hold an extreme view, and would altogether banish classical studies from the secondary education of boys who are destined to promote the trade and industry of our country. Indeed, this persistence has brought all literary studies, modern as well as classical, into disrepute among a certain class of people.

The Science and Art Department, which was commissioned by the nation to build up a system of industrial education, now found the duty thrust upon it of remodelling the classical secondary schools, so that they might offer a proper foundation on which it could build. But this was a task which it was in no way qualified to undertake. The more satisfactorily it was constituted to build up a system of instruction in science and art, the less was it fitted to determine the general course

* As influenced by the universities; cf. p. 35 *et seq.*

Premature Specialization.

of studies which must not only form a foundation for its own special designs, but must also satisfy other far different conditions affecting national prosperity. For it is through secondary education that a man is trained not only to learn his future bread-winning occupation, but also to fulfil his wider duties as a citizen. And as we have already seen, from an educational point of view, there is a period in the course of general development which is occupied with the general adaptation—intellectual, moral, and physical—to all that composes the modern environment. Secondary education covers the greater part of this period. The “special” idea, associated with future bread-winning occupations, belongs to a later stage.

We shall see below that the whole strength of the German system, the prime cause of its successful providing of true hearts and clear heads, is to be found in the determined efforts which have been made to adapt secondary education to the requirements of the natural development of the pupil. Looking at the time-tables of the three different kinds of German secondary schools, one would conclude that the framers of these had argued in somewhat the following manner: “A man has to spend his life in certain intellectual and moral surroundings. From these surroundings he must, to a very large extent, derive his mental and moral sustenance, and at the same time he

Premature Specialization.

must be able to conquer all influences in them which are detrimental to his mental and moral well-being. It is, therefore, essential that he should be so educated that he may be as thoroughly adapted, mentally and morally, to these surroundings, as he must needs be physically. His mental and moral development must, therefore, follow those lines which will lead him into contact, under the guidance of the educator, with all the influences of his future surroundings. Let us, therefore, consider in what these influences consist, and what branches of knowledge correspond to them. All of these branches must be represented in the secondary schools, where he spends not the least important portion of that period during which general development takes place. If in future life he is destined to be a scholar, and to dwell in surroundings impregnated with the thoughts and learning of the ancients, he will not on that account be cut off from the influences of science and of modern thought. The secondary school must not, therefore, teach him classical languages and literature alone. If, on the other hand, he is destined to spend his life in the surroundings of modern industry, where science reigns supreme, he will not on that account be cut off from the influences of literature, of art, and of religion. The secondary school must not, therefore, provide him merely with instruction in science." The Germans have,

Premature Specialization.

consequently, weighed the respective values of the different branches of knowledge, and determined the influence which must be allowed to each in secondary studies. But it is doubtful whether they would ever have arrived at this appreciation of the common features in the surroundings of different classes of men, if they had not first been forced to recognize the common duties imposed by nationality. America, as will be shown later on, has led in a remarkable degree to the same result by very different causes.

By adhering steadily to such principles—though they may not represent the final truth of the science of education—blunders such as we have made may be avoided. In our modern secondary schools science has been allowed to oust other subjects, on the plea that they will not be “useful” in industrial occupations. Religion has been the first to go, and in many secondary “Schools of Science,” under the direction of the Science and Art Department, it is not taught at all. Men who have been trained in such schools must find themselves strangely out of touch with their surroundings, unless their parents have undertaken to make good the deficiencies of their education. Again, insufficient time has been given to modern languages ; therefore the men who have been brought up in these schools, have not only been isolated from the thoughts of foreign countries, but have

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found themselves seriously handicapped if engaged in commercial pursuits.

When it is said that the Science and Art Department is responsible for the cardinal error of our education, namely, premature specialization, it is not intended to suggest that the fault is altogether to be laid at the door of that office. It has all along acted up to its lights; the fault lies much more with the people and the Governments who have entrusted the organization of our modern education to a body created with one special object, and with one special mission in no way directly concerned with secondary education. Again we are brought back to the common root of all such errors—the want of a national feeling which can alone produce a national system of education. Had there not been this want, even the doctrine of “utility,” which has found no little favour in English educational circles, might have saved us from many of the faults which we have committed.

A careful consideration of the educational foundations of trade and industry provided by foreign countries will lead to the conviction that, in those very countries which are supposed by us to owe their success to their schools, considerations of the future occupation of a boy have not been allowed to weigh so much as in England with regard to the choice of subjects for his secondary

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education. It would, therefore, appear that we are wrong in asserting that Germany, for example, is every year becoming a more formidable rival for us in trade and industry because of her technical education. This is but a partial truth. We have directed quite as much attention to the provision of special education for industry as Germany, but with this difference. We have allowed this special education to commence in the secondary school, whereas Germany has endeavoured to postpone it till after the completion of secondary education, and has succeeded in so far as that national system is concerned which she has built up under the control of the central Government. We, on the other hand, have allowed and encouraged our Government to transform the modern "sides" of our secondary schools into technical schools of a more or less specialized type. A large number of our old grammar schools found themselves, in the latter half of the century, without those financial resources which would enable them to meet the demands for secondary education of a modern, in contrast to the classical, kind. The Government decided—with the consent of the people undoubtedly, because it was now democratic in its form—that financial aid should only be given to these schools by, or under the regulations of, the Science and Art Department. But this Department was only permitted by law to aid technical

“ Higher Grade ” Schools.

education ; consequently it could only give financial assistance to the grammar schools in consideration of the technical education which they provided. Unless we are ready to admit that the people and their representatives in Parliament are strangely ignorant of the laws which have been made by Parliament, we must conclude that this transformation of the modern sides of our grammar schools into technical schools was undertaken deliberately by the nation.

But while the people and their representatives in Parliament thus infringed the fundamental principles of education, the offices to whom were entrusted the administration of the Education Acts were allowed to make confusion worse confounded. These offices encouraged school boards to create, illegally as it has recently been decided, “ higher grade ” schools * which offered technical education of precisely the same kind as that provided by the “ modern sides ” of the grammar schools. As a consequence there ensued a bitter rivalry between those grammar schools and higher grade schools which both conformed to the regulations of the Science and Art Department—a rivalry which did not tend to promote the interests

* This is not the place to discuss the “ illegality ” of evening continuation schools supported by the public rates. Their “ illegality ” is a fact which can no longer be disputed ; but it points to the extraordinary neglect of Parliament to provide for all necessary kinds of education.

Reform.

of education. For these two types of school competed for public favour—as represented by the grants of money for technical instruction—by offering the greatest quantity of technical education possible. This, in short, has been the only work of the Government in support of English secondary education.

We are now, however, entering upon a period of reform. In face of external opposition, a national feeling is slowly but surely springing into existence. The popular appreciation of the need for a national system of education was recently expressed in the passing of the Board of Education Act, which aimed at creating an educational Ministry with branches to preside over primary, secondary, and technical schools. All our energies must now be directed towards the organization of our secondary education. Until we provide in the secondary sphere a broad general basis of instruction, we cannot expect to train our commercial and industrial leaders so that they shall be equal to those of our foremost foreign rivals. Our older universities have had the opportunity of reforming our secondary schools, and have refused it. The task must now be undertaken by the people themselves, represented by local authorities under the guidance of an enlightened central government. It will probably be by pressure from below that the universities will be

Foreign Educational Systems—

compelled to recognize that a spirit of conservatism, ever lagging behind in the march of progress, cannot offer a healthy educational influence for those who have to contend against the modern culture of foreign nations. Already there is a widespread feeling that Oxford and Cambridge bring influences to bear on the sons of the men of industry and commerce which disqualify them for the occupations of their fathers. Such men, therefore, turn to the newer universities which are springing up in different parts of the land. The great danger is that these may go to the other extreme, and ignore that spirit of culture which proceeds from the moral and æsthetic ideals of the human race. Will it also be pressure from below which will come to save these newer universities from these dangers which beset them?

The increasing attention which is paid in this country to foreign systems of education, must give rise to some misgiving, though, on the other hand, it may be regarded as a hopeful sign. How complicated is the study of foreign systems, is shown by the fact that our system of technical education was professedly designed in imitation of that of Germany ; and yet no two systems could be more utterly different. To such an extent have we been misled by those who have pretended to a knowledge of German education. Among these many of the Germans themselves who are our welcome guests,

And their Exponents.

are most to be mistrusted. Often they ingenuously describe to us the systems of their youth, forgetting that the Fatherland has also grown older and wiser since they left its shores. Many earnest members of school boards, speaking little French and less German, after a too short visit to foreign countries, have returned to extol the virtues of foreign schools to their admiring fellow-citizens. But imitation of foreign countries will never help us to build up a national system of education. The first thing we learn from a careful comparative study of foreign schools is that each nation must build up the educational system best suited to its own requirements, and best adapted to the natural genius of its people. When once this fact has been firmly grasped, we may learn much if we ponder the causes which have produced sharp contrasts or striking similarities among the systems of the four great nations in the van of modern civilization. The succeeding chapters have been written in the hope that they may throw some light on this phase of the subject.

CHAPTER IV.

THE FOUNDATIONS LAID BY GERMAN GOVERNMENT.

IT has been remarked, in a preceding chapter, that the Prussian organization of education has been the model for most of the other German States, whose systems have been, during the last century, and still appear to be, assimilating themselves to that of Prussia. To thoroughly appreciate this fact, it is necessary to understand the causes which have led Germany to accept Prussia as her head and leader. No more than a very brief outline of these causes can be given here.

By the peace of Westphalia, in 1648, the disunion of Germany was formally consecrated for the benefit of France, who henceforth became the dominant power in Europe. The old Empire now became a medley of States under independent rulers, owing, nominally, allegiance to an Emperor who was in reality nothing more than the head of the Austrian Monarchy. The rulers of these States, who revelled in their independence, were encouraged by France to accept her protection against all

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interference from their nominal head. We have, therefore, on the one hand, Austria, endeavouring to bring these States into an Empire which should be more than a mere name, and over which she should preside ; on the other, France, who, having by her clever diplomacy and the assistance of her arms brought about the disruption of the old Empire, was determined that it should not be allowed again to become an obstacle to her ambitions as arbiter of the destinies of Europe.

About this time a rival to Austria began to rise into prominence: the Prussian Monarchy now commenced to extend its borders, and to aspire to the headship of Germany. Prussia had, indeed, one advantage which Austria did not possess, for she was exclusively German in her interests, while Austria was composed of peoples only a part of whom were German. The situation was, therefore, briefly this. Prussia, with a better claim than Austria, was attempting to build up a new German Empire under her direction. Austria naturally opposed this attempt. France naturally found it to her interest to resist any endeavour to restore German unity, whether under Prussia or Austria. Besides these three parties in the game, there is also a fourth to be considered, namely, the independent German States, whose rulers were anxious to maintain their independence at all costs and by whatever means.

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At the beginning of the nineteenth century France, under the leadership of Napoleon, subdued the three other parties—Austria, Prussia, and the independent States. In the struggle that followed, so great was the mutual distrust of Prussia and Austria, that they were unable to co-operate against the common enemy ; and it was not until the Prussian people revolted against the indignities heaped upon them by the French, that Prussia threw in her lot with the enemies of Napoleon. The present Prussian system of education may be said to be popular, in that its foundations were laid in the national feeling which was aroused at this time by French opposition. It was at this moment, when the Prussian people were aroused to the need of national reconstruction, and statesmen worthy in every way to give practical effect to the popular will had arisen, that the value of national education was for the first time properly appreciated. The spirit which was then breathed into the Prussian system of education is not yet dead, for later events have tended to keep it alive.

When Napoleon was finally overthrown, the hostility between Austria and Prussia again appeared at the Congress of Vienna, which met to restore the balance of Europe. The rulers of the independent States, who had for the most part fought on the side of Napoleon, were still opposed to any restoration of the German Empire. France

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and Austria, taking advantage of this feeling, and also of the inability of the King of Prussia to appreciate the aims and ideals of the Prussian patriots, now again succeeded in throwing insuperable obstacles in the way of German unity under the leadership of Prussia.

When the people of Germany realized how their wishes had been disregarded by their rulers, and how the great wars had merely resulted in a new assertion of prerogatives and a fresh ignoring of their rights, a strong tendency towards liberalism set in among them. In 1848, when the great revolutionary wave swept over Europe, this feeling took practical effect. "The Germans of those days might have called themselves Liberal-Unionists. They were Liberals because they had been overdosed with divine rights, and Unionists because they wanted to be a nation. There were between thirty and forty divine rights in the country, each of them endued with authority, or, as it was called, sovereignty, over a region large or small, the largest being the kingdom of Prussia, and the others of various sizes down to little duchies like Saxe-Coburg-Gotha." * The first national Parliament of Germany assembled at Frankfort in response to this outburst of feeling. This Parliament made a constitution, settled the boundaries of the proposed Empire—leaving Austria outside—

* Spenser Wilkinson, "The Great Alternative," p. 53.

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and elected as Emperor, Frederick William IV., King of Prussia. Austria being joined by Russia in her opposition to this scheme, Prussia declined the dangerous honour of presiding over the suggested constitutional Empire.

This Parliament did, however, achieve something, in that it formally pointed to Prussia as the natural leader of the German nation. Thus had the people, who at the beginning of the century had recognized only an intellectual and æsthetic metropolis, now at last come to perceive the necessity of a political capital where would be centred all the forces proceeding from the common national sympathies and antipathies. Weimar, where Goethe and Schiller had presided over the consolidation of the intellectual Empire of Germany, was now to be replaced by Berlin, where Bismarck was, by his diplomacy, directing all political tendencies towards one definite aim.

The overthrow of Austria, and of the rulers of independent German States who were still opposed to unity, in 1866, left France as the only enemy to the establishment of a German Empire. The war of 1870 not only destroyed the opposition of France, but further consolidated German unity by restoring to the newly founded Empire territories which had been stolen by the French in time of peace.

It was such success as this which first recom-

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mended the educational system of Prussia to the rest of Germany. An English writer has already been quoted as stating that Prussia deserved the position at the head of Germany, which she won in 1866, and maintained in 1870; for she had learnt that the requisites to national regeneration were true hearts and clear heads. And, continuing, he says—

“An army under the command of genuine leaders is a good school of duty; and, in the hand of Scharnhorst and his companions, the Prussian army taught one generation of Germans to obey, to endure, and to die. Stein and Hardenberg reshaped a number of institutions with a view to bind rich and poor together in the bonds of a common welfare. Fichte, W. Humboldt, Niebuhr, and their fellows strengthened the foundations of that part of education which is given by the school and the university. The aim was not to give every man the whole of knowledge, but to give each man the particular knowledge necessary to enable him to do his particular life's work, as well as the general knowledge required to make a good citizen.

“From this ideal resulted a public school system which, in spite of faults, made the Prussians the people among whom the general knowledge conveyed by primary and secondary instruction was most widely spread and most fully developed. . . . The system aimed at quality, not quantity. Each student was trained to spontaneous effort, and taught a method, and he became himself an active searcher, seeking to enlarge the bounds of knowledge in the particular region which he had

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entered. Thus, for every career in which knowledge is an element of success, there were Prussians better equipped than most of their competitors in other countries. In the army and all branches of the public service the professional knowledge gradually came to be the indispensable condition of advancement. The universities became genuine fountains of knowledge, corporations organized to acquire and to spread a deeper insight into nature and human life than had existed before. A generation of German teachers became the teachers of their class all over the world. Until a few years ago, university professors outside Germany were little more than the channels through which the teaching of the German masters found its way, more or less diluted, to the pupils."

There are two points which are particularly worthy of notice in connection with the reorganization of Prussian education between 1808 and 1818. The first is that W. von Humboldt, who was the first head of the reorganized education department, was a man who had formerly been strongly opposed to all State interference in education. Events had taught him, however, as only such events as he had witnessed can teach, that the State must undertake to provide proper schools, suitable instruction, and, what is still more difficult, effective methods of education for the people. And this brings us to the second point. It was not knowledge alone that was necessary to make the people who had been defeated at Jena into a nation, strong to resist one of the most powerful foes

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which the world had seen, and able to recover from the state to which they had been reduced.

Something, it is true, could be done by political enactments, freeing the people from burdens and restrictions imposed on them in the interests of the ruling classes. But more than this was necessary. The Government had in the past been merely an institution for maintaining the ruling dynasty and the officials dependent upon it. From the people it demanded obedience and a mechanical performance of duty. The shock with the armies of Napoleon taught Prussia that even in war the strength of the conqueror does not consist merely in the obedience of the forces which he commands. Military writers are inclined to overlook the fact that the genius of Napoleon could not have defeated the greatest armies of Europe, had it not been served by the spirit of freedom and the enthusiasm of individual responsibility which the French Revolution had sown in the breasts of his soldiers. The Prussian statesmen of that time, however, perceived this fact ; and the greatest of them, Stein, recognized that the work of education, which had now to be undertaken by the State, must not be directed towards the inculcation of passive obedience, but rather towards the fostering of self-activity and self-reliance among the people to whom they looked for the regeneration of the nation. So that, at what may be considered the

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initiation of the State control of the modern German educational system, considerations of method—of the meaning and aim of education itself, rather than of its outward form or the field of knowledge which it was to command—were forced upon the officials to whom this control was committed. This is a necessity to which such officials have never yet been reduced in England.

The method of education needed was ready to the hand of the organizers of the Prussian system. Amidst the din of battles and the fall of kingdoms, the son of a Zurich doctor had been trying educational experiments, one after the other of which had proved a financial failure. An unpractical idealist he seemed to many; and yet his loving devotion to the poor and oppressed, his perseverance in spite of failure and innumerable disappointments, won for him ultimately such worship from all classes of society as is rarely vouchsafed to man. The most distinguished people of the time travelled far to see him, and to express their admiration for all he had done to educate the destitute and helpless. The one person who is said to have turned from Pestalozzi with the remark that there were more important things than the learning of the A.B.C., was Napoleon. And yet there was probably no man who did more to remove the traces of Napoleon's work in Germany than Pestalozzi.

Pestalozzi.

The whole of Pestalozzi's life was spent in an active protest against all that was dead and mechanical in the educational methods of his time—methods which are unfortunately still too common. The mere teaching of words, as opposed to things; the presenting to the child of "a crowd of ready-made judgments, which he may hold in his memory, but which leave his power of thinking inactive, and tend even to paralyze it"; that instruction which is based on the passive obedience of the pupil, and commands his acceptance on authority of what he cannot understand, this it was that Pestalozzi considered most harmful in the existing methods of education. To him the child was a living, active being, whose development, whether physical, mental, or moral, followed a certain natural course. "Man develops the fundamental elements of life, *i.e.* his love and faith, by the exercise of love and faith; those of his intellectual life, that is his thought, by the exercise of his thought; those of his practical or industrial life, that is the power of his organs and his muscles, by the exercise of this power. Man is urged by the very nature of the forces within him to employ them, exercise them, give them all the development, all the perfection, of which they are capable." And it is this self-activity which, according to him, should form the basis of all education.

Pestalozzi may be said to have founded technical

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education, in that he insisted that practical skill was one of the necessary acquirements of education. He maintained, however, that practical skill presupposed intellectual training, without which it could not be successful. Above all, what he sought to form, were men fully developed ; free, and worthy to enjoy freedom ; self-active, and employing their self-activity in the realization of their own highest capacities, for the good of themselves and those fellow-citizens to whom they were united by the bonds of love and a common responsibility to their country. Such, in brief, was the theory of education which the founders of the modern German system found ready to their hands. They adopted it, and, thanks to it, they built up a nation of self-dependent men strong in their self-activity.

It is impossible to exaggerate the benefit it was to Prussia to be obliged, at the outset, to consider methods rather than the outward form of education. Had it not been for national disaster this might never have been necessary. It may be said that the effects of this are still felt, and in every German school, in every meeting of German teachers, there is an appreciation of the higher aims and purposes of education which we do not commonly find in England. When we first established a system of education for the children of the poorer classes, we were not urged on by any need for national regeneration ; we were not reduced to

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a position where it was imperative that we should reconsider the foundations of our national strength, and use every means in our power to restore it to heights from which it had been cast down. We were merely forced by the final establishment of democracy, as our form of government, to see that the lower classes learned to read and to write, and to calculate. And it must be admitted—not without feelings of humiliation—that until the end of last century in England the State was chiefly occupied in providing a sufficient *quantity* of education, a sufficient number of "school places," and paid but little attention to the *quality* of its education, regarding methods of instruction and educational theories as fit only for the contemplation of faddists or enthusiasts.

The science of education founded by Pestalozzi was not certainly complete or final, and it was not accepted as such by the educational reformers whom Prussia employed at the beginning of the century to restore her fallen fortunes. But it was a science, and it did offer a basis on which might be gradually built up the true science. It ensured, therefore, methodical progress: not the mere haphazard adoption of methods or subjects of instruction in obedience to a passing whim or an ephemeral need, but the thoughtful fitting in of subjects into a well-organized scheme, and the careful readaptation of methods of teaching to the

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ever-new discoveries of educational science. And it is a remarkable fact, in connection with the State control of education in Prussia, that, as that control has increased, there has at the same time been an increasing tendency on the part of the State to demand the best expert opinion on proposed changes. Each far-reaching and important change has been preceded by a conference of experts, representative of all shades of opinion. In short, we may say that educational progress in Prussia has been evolutionary, rather than revolutionary, in the strictest sense of the term; whereas the best defence that can be made for corresponding progress in England is to be found in the fact that it has followed a process of broadening down from precedent to precedent, a formula which is conveniently adaptable to any course of progress, however irregular, and however defective, so long as it is not marked by any extraordinary energy or vitality, and never gives evidence of revolutionary tendencies.

Too much emphasis cannot be laid on the fact that Pestalozzi ignored social distinctions in his educational system. Consequently, in such a country as Germany, his opinions might not have had great weight had he not had the good fortune to preach in a time of national adversity.*

* Though the work of Herbart, which may be said to have supplemented that of Pestalozzi, cannot be considered here, its importance cannot be overrated.

Social Prejudices.

Educational reformers find their strongest opponents in those classes of society who owe their position and their *raison d'être* to tradition. And it is always to these classes that the supporters of old-fashioned and discredited educational theories turn for support. In England, we know how cleverly social prejudices have been pressed into the service of educational conservatism. Often the question of classical *versus* modern education has been fought out on the argument that Latin is essential to the education of a gentleman; and thus infinite damage has been done to the cause of classical education itself, by leading the most influential persons to overlook the true issues at stake. We find somewhat the same thing happening in Germany, whenever the external pressure from other nations has temporarily subsided, and the national aim has no longer overshadowed all others. But, fortunately for Prussia, this was not the case during the years devoted to the foundation of her educational system.

Nothing can be more instructive for the purpose in hand—that of a comparative study of the education of the men of industry and commerce in different countries—than to glance at the development of the Prussian Realschulen, the schools that now fill the place which our modern secondary schools are supposed to occupy in our

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own educational system. At the end of the seventeenth century Francke remarked : " The man who does not take up classical studies has, nevertheless, a need of knowing the principles of astronomy, geography, physics, and history, and of everything connected with the government of his country, if he wishes to become an intelligent man, and of use to the Commonwealth." In 1706, Christoph Semler opened a mathematical and mechanical Realschule in Halle. His object was not the same as that by which Dr. Birkbeck was guided nearly one hundred years later ; he did not propose to instruct uneducated adults in the scientific principles underlying trade or industry. In this school a teacher explained to poor children, for an hour every afternoon, the principles of handicraft and manufacture. In 1738, the school was restarted on a wider basis, and some slight opportunities were given to the children of the upper classes also to attend these lessons. In 1747, Julius Hecker started a Realschule in Berlin, which may, from its objects and its organization, be regarded as the true parent of all schools of the same type. He had for long been occupied with attempts to improve the elementary schools in his district ; he then turned his attention to the foundation of a secondary school for the children of the cultivated middle classes. His foremost idea seems to have been to provide

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general culture, and the technical training which his school offered seems to have occupied quite a secondary place. The subjects of instruction were: Religion, German, Latin, French, Writing, Arithmetic, Drawing, History, Geography, Moral Instruction, and the Elements of Geometry, Mechanics, and Architecture. The success of the school surpassed all expectations. In 1762, the number of pupils attending the institution was 1095, of whom 91 were boarders and 300 free scholars. Perhaps the most important part which it played in the promotion of the Realschule idea was by the establishment of a training college for village teachers, which received the royal patronage and a Government subsidy, and from which a number of trained teachers went forth to spread the new idea. Frederick II. built up his Royal Realschule on the private and voluntary efforts of Hecker and his successor. A number of similar schools were soon established in different parts of Prussia and Germany.

It is impossible here to trace through all its vicissitudes the history of the Realschulen.* These schools appear to have appealed particularly to those classes of the people whose interests seemed to clash with those of the higher ranks of society. So that, in 1848, when the revolutionary and

* I have used the German forms Realschulen, Gymnasien, etc., rather than Anglicized plurals of German words.

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democratic wave sweeping over Europe spread to Prussia, we find considerable efforts being made to procure for this modern type of school the same privileges as were possessed by the classical Gymnasium. But, as we have seen in the brief review of the history of Prussia, the effect of the revolutionary feeling of this epoch was to create a desire in Germany for unity on a liberal and constitutional basis under the leadership of Prussia. When, however, Prussia hesitated to accept the leadership on the liberal conditions imposed by the rest of Germany the whole scheme broke down, and for a time a natural reaction followed. During this period the Realschulen fared ill. It was not until Prince William (afterwards the first Emperor of the new Germany) became Regent in 1858 that Prussia again placed national considerations before all others.

In 1859 the State definitely assumed responsibility for the Realschulen, and official programmes were published. Three grades of these schools were recognized, the first having an eight years' course with Latin, the second a seven years' course without Latin, and the third a six years' course without Latin. The programme of the schools of the first grade was as follows :—

The Realschulen.

	VI.	V.	IV.	III.	II.*	I.*
Religion	3	3	2	2	2	2
Mother tongue	4	4	3	3	3	3
Latin	8	6	6	5	4	3
French	—	5	5	4	4	4
English	—	—	—	4	3	3
Geography and History . . .	3	3	4	4	3	3
Natural Science	2	2	2	2	6	6
Mathematics and Arithmetic .	5	4	6	6	5	5
Writing	3	2	2	—	—	—
Drawing	2	2	2	2	2	3
	30	31	32	32	32	32

The lowest grade of these schools, with only a six years' course, and without Latin, seems originally to have been intended to be a sort of higher primary school. It is interesting to observe that all three grades were declared officially "to possess a common aim—that of assuring a general scientific preparation for those vocations for which university studies were not requisite." It is also worthy of notice that Latin was retained in the highest of these three grades, "not only because of its importance as leading to a knowledge of the relations between modern civilization and antiquity, but, above all, for its undeniable utility in the study of modern languages, which can only be

* Two years were spent in each of these classes. It may be mentioned here, once for all, that in practically all foreign schools one year is spent in each class. The advantage of this arrangement over that common in England is self-evident.

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learned superficially unless supplemented by the study of Latin." And, further, as showing the kind of educational spirit by which the Prussian Government was moved, the following words may be noted, offering an official explanation of the lines on which the new programmes had been designed: "To insure thoroughness and a proper assimilation of knowledge, it is essential that one's efforts should be confined within certain fixed limits. The science of education is always reinforcing the truth of this experience: that when seed is sown too thickly the field is less productive." But it must not be imagined that when the Realschulen were once finally established by Government the fight was won. This event merely marked the commencement of an organized agitation in favour of granting the same privileges to the new education as were already possessed by the old. Pupils obtaining the leaving certificate of a gymnasium were admitted to the universities and all higher institutions; those holding a similar certificate from the Realschulen obtained little more than a reduction of the years of compulsory military service. In 1869, the ministry of education consulted the universities as to whether they would grant full privileges to the pupils of the Realschulen; when they replied in the negative, the Government took the matter into its own hands, and threw open to the pupils of the highest grade

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of Realschulen * the philosophical faculty of the university, and admitted them to the examinations for teachers of mathematics, natural science, and modern languages.

The next great reform took place in 1882. The programmes for the classical Gymnasien underwent considerable modification in a modern direction. The hours devoted to Latin and Greek were reduced, and greater time was allotted to French, mathematics, history, and science. The system of Realschulen was remodelled: the highest grade, in which Latin was taught, now received the name of Real-gymnasium, and its course was lengthened to nine years. The lower grade was combined with an existing type of technical school to form what was called the Ober-Realschule, a modern secondary school, also with a nine years' course, but without Latin. The Realschule with the six years' course now finally became a secondary school, and threw off all higher primary tendencies. It was considered not as a crowning to the primary system, but as providing the irreducible minimum of secondary education for those who could not afford a nine years' course. It adopted the programme of the lower classes of the Ober-Real-schule, and thus formed an integral part of the secondary system. Too much emphasis cannot

* Corresponding to the present Realgymnasium as described in the succeeding paragraph.

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be laid on this principle, which should be compared with that guiding the development of the higher primary schools of France (cf. p. 162 *et seq.*).

The next great reform took place in 1892. The present Emperor stated, in a Royal proclamation issued in 1889, that he had for a long time been occupied with the problem of how to make the school useful for the purpose of counteracting the spread of socialistic and communistic ideas. In the same year a decree was issued directing modifications in the historical teaching in the State schools. In 1890, a conference was summoned to consider certain changes, mostly of a modernizing and anti-classical nature, which the Emperor advocated for Prussian secondary schools. The composition of this conference is instructive. Of the forty-three members summoned, two were factory owners, one was a medical man, and five were representatives of the clergy; thirty-six were actually engaged in teaching, or held public educational positions, proving that they had formerly distinguished themselves in the scholastic profession. The Emperor opened this conference in a characteristic speech, in which he dealt with the important questions to be decided. The conclusions of this conference were ultimately embodied in the official "curricula and programmes for the secondary schools of Prussia."

Before entering into any details as to the changes which were now made, a few considerations may

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not be out of place as to the methods adopted on this occasion by the Prussian Government for reforming the schools under its control. There is a prevalent idea in England that the schools are used in Prussia for the inculcation of those principles which are favoured by the Government. This is often advanced in support of arguments against the State control of schools in England. It is, no doubt, true that the present Emperor has made an attempt to direct the teaching of the secondary schools against certain doctrines which he has believed to be harmful to national unity and strength. But it is impossible for such an attempt to succeed unless only those teachers are appointed who hold precisely the same views as the Emperor; for no man can be forced to teach history in such a way as will support views in which he does not himself believe. It is, however, impossible to select teachers for the Prussian secondary schools on any such principle, the supply in the training seminaries being, if anything, below the actual demand. Whatever may have been the Emperor's intentions, he was bound to fail in any attempt to impose his will in this or other respects on the whole teaching body.

The action of the Prussian Government, when it thinks it necessary to reform its schools, is indeed in marked contrast to that of our own under

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similar circumstances. Our Government permits its officials to make what changes they like for the benefit of the schools under its control. Such changes are made by the officials—hardly any of whom have had educational experience beyond that of their own boyhood—generally without consulting experts or even the Government inspectors. The autocrat King of Prussia, on the other hand, calls to his assistance the most enlightened representatives of the teaching profession. It is likewise significant that, while our Government takes little or no interest in the question of secondary education, the Kaiser thinks it of such importance to the nation that he himself opens the conference which is to decide important reforms in its organization, and even places before it his own carefully thought out and original views as to its aims.

The system of secondary education in Prussia, as remodelled by the Congress of 1890, will be seen from the following official time-tables.*

* I have adopted the translation of these tables made by Mr. W. G. Lipscomb ("Special Reports" of the Education Department, vol. 3). Boys generally enter this secondary school when they are nine years old. Where hours are bracketed together it signifies that one teacher should be entrusted with the subjects to which they relate, and that the hours may be divided between these subjects as the school authorities desire. The normal time-table of the Realschule is the same as that for the first six classes, or years, of the Oberrealschule. But this may be changed according to the requirements of special districts. Such changes have been carried out in table D.

Prussian System of Secondary Schools.

A.—TIME-TABLE FOR GYMNASIEN (CLASSICAL SCHOOLS).

	VI.	V.	IV	IIIb.	IIIa.	IIb.	IIa.	Ib.	Ia.	Total.	Compared with formerly.
Religion.....	3	2	2	2	2	2	2	2	2	19	+ 0
German and	3 } 4 } 8 }	2 } 3 } 8 }	2 } 3 } 7 }	2	2	3	3	3	3	26	+ 5
Historical											
Narration ..											
Latin	8	8	7	7	7	7	6	6	6	62	- 15
Greek	—	—	—	6	6	6	6	6	6	36	- 4
French	—	—	4	3	3	3	2	2	2	19	- 2
History and	2	2	2	2	2	2	3	3	3	26	- 2
Geography .											
Arithmetic	4	4	4	3	3	4	4	4	4	34	+ 0
and Algebra											
Natural His-	2	2	2	2	—	—	—	—	—	8	- 2
tory											
Physics, Ele-	—	—	—	—	2	2	2	2	2	10	+ 2
ments of Che-											
mistry, and	—	—	—	—	—	—	—	—	—	—	—
Mineralogy.											
Writing	2	2	—	—	—	—	—	—	—	4	+ 0
Drawing	—	2	2	2	2	—	—	—	—	8	+ 2
Total	25	25	28	30	30	30	28	28	28	252	- 16

B.—TIME-TABLE FOR REALGYMNASIEN (MODERN SCHOOLS WITH LATIN)

	VI.	V.	IV	IIIb.	IIIa.	IIb.	IIa.	Ib.	Ia.	Total.	Compared with formerly.
Religion.....	3	2	2	2	2	2	2	2	2	19	+ 0
German and	3 } 4 } 8 }	2 } 3 } 8 }	2 } 3 } 7 }	3	3	3	3	3	3	28	+ 1
Historical											
Narration....											
Latin	8	8	7	4	4	3	3	3	3	43	- 11
French	—	—	5	5	5	4	4	4	4	31	- 3
English	—	—	—	3	3	3	3	3	3	18	- 2
History and	2	2	2	2	2	2	3	3	3	28	- 2
Geography..											
Arithmetic	4	4	4	5	5	5	5	5	5	42	- 2
and Algebra											

Prussian System of Secondary Schools.

	VI.	V.	IV.	IIIb.	IIIa.	IIb.	IIa.	Ib.	Ia.	Total.	Compared with formerly.
Natural History.....	2	2	2	2	2	2	—	—	—	12	± 0
Physics.....	—	—	—	—	—	3	3	3	3	12	± 0
Chemistry and Mineralogy.	—	—	—	—	—	—	2	2	2	6	± 0
Writing.....	2	2	—	—	—	—	—	—	—	4	± 0
Drawing.....	—	2	2	2	2	2	2	2	2	16	— 2
Total.....	25	25	29	30	30	30	30	30	30	259	— 21

C.—TIME-TABLE FOR OBERREALSCHULEN (MODERN SCHOOLS WITHOUT LATIN).

	VI.	V.	IV.	IIIb.	IIIa.	IIb.	IIa.	Ib.	Ia.	Total.	Compared with formerly.
Religion....	3	2	2	2	2	2	2	2	2	19	± 0
German and Historical Narration..	4 { 3 } 1 { 5 } 1 { 6 }	3 { 4 } 1 { 4 } 6 { 6 }	4 { 4 } 6 { 6 }	3 { 6 } 6 { 6 }	3 { 5 } 4 { 4 }	3 { 4 } 4 { 4 }	4 { 4 } 4 { 4 }	4 { 4 } 4 { 4 }	4 { 4 } 4 { 4 }	34	+ 4
French.....	—	—	—	5	4	4	4	4	4	47	— 9
English.....	—	—	—	5	4	4	4	4	4	25	— 1
History and Geography.	2	2	2	2	2	1	3	3	3	28	— 2
Arithmetic and Algebra	5	5	6	6	5	5	5	5	5	47	(See German). — 2
Natural History.....	2	2	2	2	2	2	—	—	—	12	— 1
Physics.....	—	—	—	—	2	2	3	3	3	13	— 1
Chemistry and Mineralogy.	—	—	—	—	—	2	3	3	3	11	+ 2
Writing.....	2	2	2	—	—	—	—	—	—	6	± 0
Freehand Drawing...	—	2	2	2	2	2	2	2	2	16	— 8
Total.....	25	25	28	30	30	30	30	30	30	258	— 18

Prussian System of Secondary Schools.

A.—TIME-TABLE FOR GYMNASIEN (CLASSICAL SCHOOLS).

	VI.	V.	IV	IIIb	IIIa	IIb	IIa	Ib	IA.	Total.	Compared with formerly.
Religion.....	3	2	2	2	2	2	2	2	2	19	+ 0
German and Historical Narration ..	3 { 4 } 1 { 8 }	2 { 3 } 1 { 8 }	3 { 3 } 7	2	2	3	3	3	3	26	+ 5
Latin	8	8	7	7	7	7	6	6	6	62	- 15
Greek	—	—	6	6	6	6	6	6	6	36	- 4
French.....	—	—	4	3	3	3	2	2	2	19	- 2
History and Geography .	2	2	2	1	1	1	3	3	3	26	- 2 (See German).
Arithmetic and Algebra	4	4	4	3	3	4	4	4	4	34	+ 0
Natural History	2	2	2	2	—	—	—	—	—	8	- 2
Physics, Elements of Chemistry, and Mineralogy .	—	—	—	—	2	2	2	2	2	10	+ 2
Writing	2	2	—	—	—	—	—	—	—	4	+ 0
Drawing	—	2	2	2	2	—	—	—	—	8	+ 2
Total	25	25	28	30	30	30	28	28	28	252	- 16

B.—TIME-TABLE FOR REALGYMNASIEN (MODERN SCHOOLS WITH LATIN).

	VI	V	IV	IIIb	IIIa	IIb	IIa	Ib	IA.	Total.	Compared with formerly
Religion.....	3	2	2	2	2	2	2	2	2	19	+ 0
German and Historical Narration...	3 { 4 } 1 { 8 }	2 { 3 } 1 { 8 }	3 { 3 } 7	3	3	3	3	3	3	28	+ 1
Latin	8	8	7	4	4	3	3	3	3	43	- 11
French	—	—	5	5	5	4	4	4	4	31	- 3
English	—	—	—	3	3	3	3	3	3	18	- 2
History and Geography..	2	2	2	2	2	2	3	3	3	28	- 2 (See German).
Arithmetic and Algebra	4	4	4	5	5	5	5	5	5	42	- 2

Prussian System of Secondary Schools.

	VI.	V.	IV.	IIIb.	IIIa.	IIb.	IIa.	Ib.	IA.	Total.	Compared with formerly.
Natural History.....	2	2	2	2	2	2	—	—	—	12	± 0
Physics.....	—	—	—	—	—	3	3	3	3	12	± 0
Chemistry and Mineralogy.	—	—	—	—	—	—	2	2	2	6	± 0
Writing.....	2	2	—	—	—	—	—	—	—	4	± 0
Drawing.....	—	2	2	2	2	2	2	2	2	16	— 2
Total.....	25	25	29	30	30	30	30	30	30	259	— 21

C.—TIME-TABLE FOR OBERREALSCHULEN (MODERN SCHOOLS WITHOUT LATIN).

	VI	V.	IV.	IIIb.	IIIa.	IIb.	IIa.	Ib.	IA.	Total.	Compared with formerly.
Religion....	3	2	2	2	2	2	2	2	2	19	± 0
German and Historical Narration..	4 } 3 } 5 } 1 }	3 } 4 } 1 }	4 } 4 } 6 }	3	3	3	4	4	4	34	+ 4
French.....	6	6	6	6	6	5	4	4	4	47	— 9
English.....	—	—	—	5	4	4	4	4	4	25	— 1
History and Geography.	2 } 2 }	2 } 2 }	2 } 2 }	2 } 2 }	2 } 2 }	1 } 3 }	3 } 3 }	3 } 3 }	3 }	28	— 2 (See German).
Arithmetic and Algebra	5	5	6	6	5	5	5	5	5	47	— 2
Natural History.....	2	2	2	2	2	2	—	—	—	12	— 1
Physics.....	—	—	—	—	2	2	3	3	3	13	— 1
Chemistry and Mineralogy.	—	—	—	—	—	2	3	3	3	11	+ 2
Writing.....	2	2	2	—	—	—	—	—	—	6	± 0
Freehand Drawing...	—	2	2	2	2	2	2	2	2	16	— 8
Total.....	25	25	28	30	30	30	30	30	30	258	— 18

Prussian System of Secondary Schools.

D.—SPECIMEN OF TIME-TABLE OF REALSCHULE ADAPTED TO THE REQUIREMENTS OF A SPECIAL DISTRICT (see note, p. 79).

	VI.	V.	IV.	III.	II.	I.	Total.	Compared with formerly.
Religion.....	3	2	2	2	2	2	13	± 0
German and Historical Narration	5 } 6 1 } 6	4 } 5 1 } 6	5 } 6	5	4	3	28	+ 7
French.....	—	—	—	5	4	4	31	— 9
English.....	—	—	—	5	4	4	13	± 0
History and Geography.....	2	2	2	2	2	2	19	— 3
Arithmetic and Mathematics....	4	4	5	5	5	5	28	— 1
Natural History..	2	2	2	2	2	—	10	— 3
Natural Philosophy	—	—	—	—	3	5	8	± 0
Writing.....	2	2	2	—	—	—	6	— 2
Freehand Drawing	—	2	2	2	2	2	10	— 2
Total	25	25	28	30	29	29	166	— 13

To appreciate the full purpose of this system, a knowledge is necessary of the different privileges bestowed by the various courses of study. At the end of each school course an examination is held, under the supervision of a Government commissioner, by the teachers attached to the highest class of the school. The pupils who pass this examination receive a certificate of maturity, as it is called. There are also lower certificates given, as will be seen from the following list. This list shows the chief privileges bestowed by the various certificates.

Classical Gymnasium.—The certificate of maturity admits to the University for the study of

“Privileges” of Secondary Education.

Philosophy, History, Classical Philology, Law Theology, Political and Economic Science and Medicine ; the Military Medical School at Berlin : the examination for the Teaching Profession.*

Classical Gymnasium or Realgymnasium.—The certificate of maturity admits to the examination for the Teaching Profession (Mathematics, Natural Science, Geography and Modern Language); entrance examination for the Schools of Forestry (age limit 25); higher Military and Naval services (without special examination; age limit 17 to 23).

Gymnasium, Realgymnasium, and Oberrealschule.—The certificate of maturity admits to the University for the study of Mathematics and Natural Science; examinations for the Teaching Profession (Mathematics and Natural Science); special examinations for Government Architects, Engineers (civil, constructive, machine, mining, marine); Woods and Forests Department and entrance examinations to the Schools of Forestry; higher appointments in the Post-office, Telegraph Service and Imperial Bank; the Academic High School of Church Music.

Gymnasium or Realgymnasium.—Seventh-year certificate† admits to Government Survey De-

* The teaching profession referred to in this list is that of the secondary schools.

† Certificates delivered on result of examination held at the end of the seventh year, and not at the end of the full course as in the case of certificates of maturity.

“Privileges” of Secondary Education.

partment (also obtained by the sixth-year certificate with an additional course of study in special schools), dentists' examinations; civil and military veterinary examinations; higher Military and Naval services (supplemented by a special examination—for this privilege “honours” must have been obtained in English at the certificate examination).

*Gymnasium, Realgymnasium, Oberrealschule.**—Sixth-year certificate (or certificate of maturity of a *Realschule*) admits to one year's voluntary service in the Army or Navy; examination for the Teaching Profession (drawing and gymnastics); High Schools of Art and of Music; to the lower ranks of the Civil Service and Administration of State Railways (but not without special examination to posts demanding technical knowledge); the Royal Horticultural Institute at Potsdam (evidence of a certain knowledge of Latin required); Agricultural Schools at Berlin and Poppelsdorf; Pharmaceutical examination (additional knowledge of Latin demanded); Paymaster in the Army or Navy.

It is, of course, a mistake to imagine that a nation is ever guided by one single aim in the development of its educational system. In

* Certificates delivered on result of examination held at the end of the sixth year, and not at the end of the full course as in the case of certificates of maturity.

The National Aim.

Germany, as much as in any other country, many and complex forces have been at work perfecting the growth of the schools. But one aim may be said to have dominated all others, and the nation has marched towards one fixed goal, however devious the paths it has followed, and however strong the attraction of side interests. As we have seen, this resultant singleness of purpose would have been impossible had it not been for the external pressure of foreign rivalry. Indeed, we find in the history of the movement that whenever this pressure has diminished, subordinate forces have invariably exerted a stronger influence. It is particularly interesting to notice how at such times social prejudices have gathered round the traditional classical education, and for the moment threatened, even if they have not definitely achieved, a retrograde movement. And yet, throughout the nineteenth century, we may trace in Prussia the slow and consistent development of the educational system along lines which, from our distant standpoint, appear to have led straight and true towards the present consummation. Having provided compulsory elementary education up to the age of fourteen for all children who were destined for the lower occupations of life, Prussia has at the same time brought the collective energy and wisdom of the State to bear on the education of those whose duty it is, in one capacity or another,

The Science of Education—

to guide and direct the work of these lower classes. With deep respect for the results achieved by the experiments of such great educators as Pestalozzi, and of the scientific researches of such philosophers as Fichte and Herbart, her statesmen have been led to regard education as a scientific process, rather than as a mere privilege to be doled out to people in proportion to rights based on considerations of wealth or social position. The question has, therefore, been: Which is the best *kind* of education that can be given? and not, what is the greatest *amount* of education that can be allowed? Having disposed, by the assistance of scholarships for free education, of the difficulties in the way of the education of the talented child of the poorest classes, it remained to provide the best kind of education for the two classes into which the rest of the population naturally divided itself.

First, there were those who could afford to keep their children at school for an indefinite length of time; secondly, there were those who were obliged to put their children to work at the age of sixteen or seventeen. Again, from another point of view—from that of their occupation in life—this section of the population might be divided into the two following classes: those following the learned professions and those pursuing industrial, agricultural, or commercial pursuits.

If education is a scientific process, it must

based on Natural Laws—

conform to certain laws of nature. And the German scientists and philosophers have discovered—as, indeed, have the scientists and philosophers in every other country—that there are natural laws which rule the mental, moral, and physical development of man. When a nation has decided that its very existence depends on the education of the people, by which must be promoted their self-activity and self-responsibility, it will, in its considerations of education, view man as man, and not merely as a producer, a thinker, or a fighter. It will, therefore, as far as possible, insist that its education shall conform to the natural laws regulating the development of man.

These natural laws may be expressed somewhat as follows. In the case of man, the period of physical infancy—that is to say, of dependence upon others—is much longer than in the case of other animals. And mentally and morally there is a period of infancy peculiar to man as distinct from the other animals. This infancy, dependence, or helplessness is due to the fact that nature demands that every organism shall be adjusted to its environment before it can live alone. The adjustment or fitting to the environment must, therefore, be watched over and guided by those on whom it depends. The watching over and guiding of this process of adjustment is the work of education. Nature alone determines what the

Which must be obeyed—

fully developed organism is to be, and by what steps it shall arrive at the final result. It is true that those on whom it depends during the period of infancy may interfere with this development; they may have their own views as to the destinies of the organism, and they may prevent its proper adjustment to its environment, and hence its full capability of living alone in self-dependence and self-activity. The commonest way of thus interfering is to insist on special training for some future occupation before the organism has satisfactorily completed its natural development. The adjustment of man to his environment on the mental side, for instance, depends on his being fitted to live in the moral and intellectual surroundings of modern civilization. These surroundings are formed by our religion, our art, our science, and our literature. To each of these the child must be introduced by those on whom it depends. If, therefore, it is decided that, before its adjustment to this environment is as complete as nature demands, the child shall be introduced by those on whom it depends to one section at the expense of the others, it will never become a fully developed man, self-dependent and self-active.

Now, though in this argument principles have been touched on which relate to more or less modern discoveries of science, yet it illustrates truths which on the whole the German educators

and are obeyed in Germany—

have fully recognized in building up their system of education. We do not find in Prussia the attempt which we find in England and France; the State does not increase the *quantity* of the education of a child who has left the elementary school by forcing him through a course of special training before his general natural development is completed. On the contrary, it is held in Prussia that this natural development must be continued along general lines. If, for economic reasons, it cannot be continued as far as nature would demand, at any rate it is carried on as far as is possible under the circumstances. The State refuses to be a party to any spending of the resources of the nation on an education which breaks the laws of nature.

It is on this account that we find the higher primary school gradually being transformed into or replaced by the Realschule—a secondary school for those boys whose parents can only afford to maintain them in a position of complete dependence up to the age of sixteen or seventeen. This school provides a similar education to that offered by the lower classes of the higher modern secondary school (Oberrealschule) for boys leaving at the age of eighteen or nineteen. It is only necessary to study the timetables of the Realschulen to see how carefully the principle of general development is observed for those boys who will not enter the learned

In Secondary Education.

professions. And at the same time a glance at the time-tables of the classical schools will show that Prussia insists that even members of the learned professions shall have passed through a natural course of development ; for it is evident that they also must be adjusted to the surroundings of modern civilization in which they will be obliged to live.

It may seem strange, to those who are familiar with the part that Germany has played in classical research, that her classical secondary schools should pay greater attention to modern studies than those of England.

In a little book which has recently appeared in France,* the following testimony is borne to the German system of secondary education :—

“ Among the circumstances which favour German secondary education, should be noted the length of time over which the studies are spread (nine years, starting from the sixth class) ; the almost entire absence of boarding schools, which thus frees the State from a mission for which it is scarcely fitted ; the decentralization, carried as far as possible, of administrative power, which is delegated in a large measure to the provincial councils ; the practice, constantly followed by the State, of decreeing only such changes of organization as are based on the success of tried experiments ; the principle, invariably put into practice, of giving the head-master

* A Pinloche: “ L'Enseignement secondaire en Allemagne,” 1900.

French Criticism of German Education.

charge of the most important part of the teaching ; the important part that the council of masters plays in effectively directing the studies ; the confiding of moral and religious instruction to the same educators as literary and scientific instruction ; the moral as well as educational *rôle* assigned to the principal master of each class ; the manner of recruiting the staff, each member of which, after passing a qualifying examination, has to undergo a twofold course of training which guarantees the State that he possesses, besides the special knowledge requisite, certain indispensable pedagogic and professional qualifications ; lastly, from another point of view, the solicitude of the State for the material interests of its officers (who are paid their salaries quarterly and in advance without any deduction being made for their pensions) no less than for their widows and orphans, who, in addition to the grace term,* are assured a sufficient pension, however short a time the teachers may have served."

Though it is only possible here to give a very brief and incomplete account of the Prussian system of secondary schools, there is one other important reform which must be noticed. So greatly do the Germans appreciate the value of general education, that they have asked themselves if it is altogether wise that a boy should have to choose at the age of nine—when he enters the secondary school—between a classical and

* They are always given a full term's salary in the case in which the teacher dies during the course of the term. If the teacher leaves neither widow nor orphans, this term's salary may be given to those who have incurred any expense from his illness or funeral.

The Frankfort System.

modern education. As a result, they have introduced a reform, known as the Frankfort system, which has met with a good deal of favour. It has, indeed, spread to such an extent that it looks as if it might ultimately supplant the older system. It consists in having the same course of studies during the first three years in each of the three types of schools. Accordingly, a boy may attend one school up to the age of twelve, and then, if advisable, change to another, where the course of studies is better suited to his special tastes or ability.

It is evident that, if classical and modern schools are to have a common basis of this kind, it is necessary for the classical schools to abandon the teaching of classical subjects—that is to say, Latin—in the lowest classes. And, doubtless, such a proposal must have appeared at first as little less than revolutionary to a number of German teachers. But their prejudices were not as difficult to overcome as would have been the case in a country where the science of education was not studied, or, at any rate, not held in great repute. For, in this question of the postponement of Latin, educational theory immediately came to the assistance of the demands of expediency.

The great majority of those who have studied the science on which education depends for its proper performance, and particularly the followers

The Frankfort System.

of Pestalozzi, are persuaded that a child should be introduced to the unknown through the known, that it should proceed from the near to the more remote. To persons who think thus, the old idea, that education is nothing but a course of discipline, which is best carried out by collecting and presenting to the child's mind all the difficulties to be found in the realm of knowledge, is little else than heresy. Not that they make the mistake of going to the other extreme, and believe that there should be no discipline in education, or that those on whom the child depends should remove all difficulties from its path ; every teacher knows that difficulties, besides offering discipline, possess a peculiar attraction for the pupil—*Res severa verum gaudium*. But they do believe that education must conform to the natural laws of development, and that this development is a gradual strengthening of powers and functions of the mind, according to a systematic order of progress. Consequently they maintain that it is as fatal to present to the child innumerable difficulties, which it is utterly beyond the natural strength of its mind to overcome, as it is to tax the endurance of its physical powers beyond the limits which nature has imposed on them.

The law by which such persons are guided may, in its broadest and most general terms, be stated thus : what is easiest must come first, and what is

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most difficult must come last. What it is easiest for children to understand is that which is nearest to them in their actual surroundings ; what it is most difficult for their intelligence to grasp is that which is furthest from them in the realms of abstract thought. To find the sequence of difficulties, which leads from one extreme to the other, is no light task ; but it is the duty of educators to find it ; and they will be helped in so doing by a knowledge of the natural order of development of the human faculties, and by a clear perception of the ultimate goal to be attained. But though Nature decides the development of the faculties, she does not alone determine this goal, as Rousseau thought, or rather wished to think ; it is determined much more by what is of man or human in the environment.

Not only is language one of the most important links between the individual and what is human in the environment, but it is also the indispensable link between him and the thoughts of all ages, which have gone to build up and mould this environment. A knowledge of language, therefore, is the first essential element in the individual's stock of requirements. But the process by which he becomes possessed of them must conform to the law of the order of mental development ; he must proceed from the nearer to the more remote. And although, ideally speaking, his adjustment to

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his environment will not be complete until he is capable of understanding all the languages in which the greatest thoughts have been expressed, he must first grapple with that which is nearest to him, his own mother tongue. Having mastered this—which, even if he learns no other, will afford him a means of communication with foreign literature at second-hand—he will in the natural order of things proceed to the study of that language which comes next in the sequence of difficulties. If this sequence is to lead to Latin and Greek, the next step, for both the English and the German child, will be to commence the study of French. Thus did the science of education come to the aid of those Germans who were anxious that the three lowest forms of their three different types of schools should supply a common basis of instruction.

It was in Frankfort that the reform was first carried into effect in its entirety. The practical results exceeded the expectations which had been derived from theoretical reasoning. The master of the famous Frankfort Gymnasium, who is himself a distinguished classical scholar, has found that boys who, after three years' "intensive" study of French, commence the study of Latin at the age of twelve, will in a few years overtake and pass boys who have been learning Latin on the old traditional plan. And, at the same time, the former have acquired a conversational knowledge of

The Frankfort System.

French, and a mastery of its grammatical difficulties, which can only be attained from daily contact with the language.

It will be seen from the time-tables given below that in the Gymnasium Greek, and in the Realgymnasium English, is not begun until two years after the commencement of Latin. It will also be noticed that a large number of hours are devoted to the study of these languages in the early stages; so that at the commencement the pupil is brought into daily contact with the language.

A.—GYMNASIUM.*

	VI.	V	IV.	III B.	III A.	II B.	II A.	I B.	I A.	Total.	Compared with formerly.
Religion	3	2	2	2	2	2	2	2	2	19	± 0
German and Historical Narration	5	4	4	3	3	3	3	3	3	31	+ 10
Latin	—	—	—	10	10	8	8	8	8	52	- 25
Greek	—	—	—	—	—	8	8	8	8	32	- 8
French	6	6	6	2	2	2	2	2	2	30	+ 9
History and Geography	2	2	5	3	3	2	2	2	3	24	- 4
Arithmetic and Mathematics	5	5		4	4	3	4	4	3	37	+ 3
Natural History	2	2	2	2	2	—	—	—	—	10	± 0
Physics	—	—	—	—	—	2	2	2	2	8	± 0
Writing	2	2	—	—	—	—	—	—	—	4	± 0
Drawing	—	2	2	2	2	—	—	—	—	8	+ 2
Total	25	25	26	28	28	30	31	31	31	255	- 13

* Such subjects as Drilling, Gymnastics, and Singing do not appear in these tables, though they form part of the instruction provided.

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B.—REAL GYMNASIUM.

	VI.	V.	IV.	III ₂ .	III ₁ .	II ₂ .	II ₁ .	I ₂ .	I ₁ .	Total.	Compared with formerly.
Religion	3	2	2	2	2	2	2	2	2	19	± 0
German and Historical Narration ...	5	4	4	3	3	3	3	3	3	31	+ 4
Latin	—	—	—	8	8	6	6	6	6	40	— 14
French	6	6	6	4	4	3	3	3	3	38	+ 4
English	—	—	—	—	—	6	4	4	4	18	— 2
History and Geography ...	2	2	5	3	3	3	3	3	3	27	— 3
Arithmetic and Mathematics	5	5	5	4	4	4	5	5	5	42	— 2
Natural History	2	2	2	2	2	—	—	—	—	10	— 2
Physics	—	—	—	—	—	3	2	2	2	9	— 3
Chemistry ...	—	—	—	—	—	—	2	2	2	6	± 0
Writing	2	2	—	—	—	—	—	—	—	4	± 0
Drawing	—	2	2	2	2	2	2	2	2	16	— 2
Total	25	25	26	28	28	32	32	32	32	260	— 20

In 1896, four members * of the British Technical Instruction Commission, which is alluded to more than once in these pages, paid a visit to Germany, on their own initiative, with a view to ascertaining the recent progress of technical education in that country. In their letter to the Duke of Devonshire, relating the result of their inquiry, they bear the following striking testimony to the industrial

* Sir Philip Magnus, Mr. Gilbert R. Redgrave, Mr. (now Sir) Swire Smith, and the late Mr. William Woodall, M.P.

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and commercial benefits derived by Germany from her system of secondary education. They say :—

“Our recent visit to Germany has also impressed us with a sense of the advantages which the nation derives from having an organized system of secondary education. To this matter reference was made in the Report of 1884, and we desire to emphasize it. The education of a secondary school is in every way more accessible in Germany than here. The grades and differences of schools are better defined and more clearly understood ; the instruction is more disciplinary, and exercises a deep influence in the formation of habits and in the training of character ; the teaching of modern languages is insisted upon to a far greater extent than in any of our own schools, with results of the greatest possible benefit to the German clerk and commercial agent ; the absence of frequent and conflicting external examination gives more time for careful study ; the remission of two years' military service to those who reach a certain standard in a secondary school is a powerful encouragement to steady application ; and the fees are much lower than in schools of corresponding grade in this country. These are advantages which count for much in enabling the German youth to obtain a good secondary education, and in fitting him for the subsequent period of apprenticeship in the counting-house, the merchant's office, or the factory. The German boy acquires at school a stock of knowledge which is at once useful to him, and he also acquires habits of accuracy, and learns the significance of attention to detail and the importance of discipline and obedience. Our consular reports are full of references to the differences between the methods

Selection of the Fittest—

of training and aptitudes for commerce in Germany and in England, which in many ways are traceable to the fundamental differences in the secondary education of the two countries."

We shall see later on that the national aim has not remained supreme and unchallenged in the French educational ideas of the last century. Social considerations have throughout this period played a large part in the organization of her national system. Having failed, for reasons which it will be attempted hereafter to explain, to build up a democracy of as advanced a type as that existing in the United States of America, she has been compelled to use education as a means for providing checks on inordinate social ambition. Germany has not in the past been turned aside by any such necessity from a single-minded pursuit of national prosperity. It is true that, to a great extent for wise economic reasons, she has, as far as possible, refused to admit to her secondary schools those who are not fitted by nature to profit from her secondary education. In the Prussian Code of 1794, for instance, we find the following passage: "Youths who do not possess sufficient aptitude for secondary studies must as soon as possible be prevented from pursuing them, and their parents should be warned to direct them betimes towards some other profitable career."

In the same document it is, however, ordained

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that every means should be adopted for encouraging and assisting those who show special ability to continue their studies. In 1891, we find the same twofold advice repeated. It is difficult to imagine that there can, on any grounds, be an objection to such a system of severe selection of the fittest. Educationally it is as harmful to compel an individual to pursue his general studies beyond the limits prescribed by nature, as it is to force him to specialize while nature is still pursuing her process of general development. And unless all education is made free, as it is to a very great extent in the United States of America, and the fullest liberty is allowed to the individual to choose to what extent he will pursue his studies, it is essential that the State itself should undertake the work of selection. No intermediate course is theoretically sound, or could in practice prove economically successful.

But we do not find in Germany a strong desire, based on social prejudices, to prevent children of the lower classes from enjoying a liberal education. Compared with other countries, it may be said that her one object is to promote national prosperity; and to the achievement of this object her educational system is directed. There is indeed no European country which can be so profitably studied by those who desire to learn how far, and by what means, education can

German Technical Education.

best be made to subserve national ends. Her technical education, for example, is the best she can devise for the promotion of her industrial interests. In organizing this branch of education she has, again, not allowed herself to be influenced by any considerations of class interests—considerations which possess an element of pettiness galling in the extreme to the sincere educator.

Germany was the first country to bring a scientific and methodical spirit to bear on the organization of technical education; and she is to-day far ahead of any other country in Europe in the practical progress which she can show in her industrial development as a direct result of that system. It is in the higher branches of technical education that Germany excels other European countries. "We are led to believe," said the Technical Instruction Commissioners, in the letter just referred to, "that much more is being done for the training of those destined for the higher ranks of industry in many parts of Germany than in England, and this, too, notwithstanding the large sums entrusted to county councils and borough authorities under the provisions of the Local Taxation (Customs and Excise) Act of 1890." And further on, showing the course which Germany has pursued, they say:—

"It is worthy of remark that the same object

Rapid and Astounding Progress.

which called into existence some forty or fifty years ago the technical high schools has recently led to their extension and development in a new direction. As far back as that period Germany began to prepare herself for becoming a manufacturing people. It was her belief in the future applications of chemistry to industrial purposes that led to the erection and equipment at a great cost of chemical laboratories, and to the encouragement held out to students to pursue their studies in those laboratories for a period of five, six, or even seven years. The success that has attended the efforts of the Germans to appropriate many important branches of chemical manufacturing industry is well known, and the dependence of those industries on the researches of chemical experts employed in the works is generally recognized. At the Badische Anilin- und Soda Fabrik alone a hundred scientifically trained chemists and thirty engineers are now employed.

"Her brilliant achievements in the field of chemical industries have encouraged her to establish well-equipped electrical laboratories, and to develop the practical teaching of physics with the view of assisting the electrical trades, which are of comparatively recent growth. Twelve years ago the Commissioners had to report that the facilities for practical laboratory instruction in electrical technology scarcely existed, or were of the most meagre kind. At that time nowhere in Germany was to be found so well-equipped a laboratory for electrical engineers as at the Finsbury Technical College. Now there are no laboratories in England which can compare in the detail and completeness of their equipment with those we visited at Darmstadt and Stuttgart; and no facilities for original and independent

The Bases of Technical Education.

research in physical subjects to be compared with those afforded at the Imperial Physical Institute at Charlottenburg."

Germany has devoted her greatest energies during recent years to the development of this technical education of university grade. Those Englishmen who were inclined to wonder that the State in Germany has not spent all the money at its disposal on the creation of technical schools of a lower grade—as it may be said, with very slight exaggeration, central and local authorities in England have done—should, in the first place, remember that Germany's elementary education is probably as superior to our own in quality as it is in extent, and that her secondary education is infinitely better organized and adapted to the requirements of modern life than our own. In the second place, they may ask themselves whether she is not right in considering that a technical education, which is based on a sound general secondary education, is at least as essential to the promotion of industry as that which is based on elementary education, and designed in obedience to a fatal affection for practical "short-cuts." We may, therefore, before considering what Germany has done for the technical education of those who do not pass through the secondary school, glance at her great technical schools.

The first of these, the Collegium Carolinum,

Technical High Schools.

now the Technical High School of Brunswick, was founded in 1745, and is the oldest technical institution in Germany. In successive chronological order follow : Freiberg (1765), Clausthal (1775), Karlsruhe (1825), Darmstadt (1826), Munich (1827), Dresden (1828), Stuttgart (1829), Hannover (1831), Aachen (1865) ; Charlottenburg was created by the union of two existing establishments in 1882. It is thus seen that Germany had arrived at an appreciation of the value of higher technical education before we had conceived of its existence. The Central Technical College of the City and Guilds of London Institute, the only institution in England which can in any way pretend to be on the same plane as the German High Schools, was not opened until 1884.

It has been said that these institutions are of university grade. Indeed, many of them may be regarded as universities in the fullest sense of the term. They adopt, in many cases, university organization, and that view of the benefits of general culture which in many countries is peculiar to the universities among higher educational institutions. On an earlier page the saying of the director of one of these schools as to the value of general culture and of a basis of "humanistic," as opposed to "real" studies, has been quoted with reference to the danger of isolating the technical student from the ideal interests of society. How far these

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institutions have succeeded in rising to the level of the universities may be judged from one fact: in several of the States they share with the latter institutions the privilege of preparing for their professions teachers of mathematics and natural science in secondary schools. In connection with the Technical High School in Stuttgart, the four Commissioners referred to above say—

“It is noteworthy that the instruction given in the Chemical Institute is exactly of the same kind as that given in the universities, and, although a special feature of the teaching and of the equipment is the prominence given to electrolysis and to electro-chemistry generally, no attempt is made in these new laboratories to teach chemistry in its application to special industries, that part of the instruction being provided for in the main Polytechnic building.”

Professor Paulsen, of the University of Berlin, in his brilliant history of the education which prepares in Germany for the learned professions, remarks, in reference to the higher scientific training afforded by the Technical High Schools:—
“There will again come a time when in this connection it will be asked: of what is a man capable? rather than, at what school did he study? The spirit of ‘guild exclusiveness’ (Zünftlererei), by which public instruction has been led astray, will not last for ever.”

As the Technical High Schools have drawn

Technical High Schools.

nearer to the university standard, they have naturally demanded higher general attainments from the candidates presenting themselves for admission to their courses of instruction. And now, with practically no exceptions, such candidates are obliged to produce the Certificate of Maturity of a Gymnasium, Realgymnasium, or Oberrealschule (see p. 83). At the outset, however, almost all of these schools seem to have had somewhat the same aim as that which occupies the attention of the authorities founding technical schools in England to-day. Indeed, had not Germany perceived, as we do not yet seem to have perceived, the necessity for organizing and developing her secondary education, her Technical High Schools would never have been capable of the high achievements now demanded of them. The growth of these institutions may be shown by a brief account of the building up of the superb Royal Technical High School of Charlottenburg.

This institution has been formed from the union of the Berlin Architectural Academy and the Industrial Academy. The School of Architecture was founded in 1799. The conditions of admission at the outset were: that the candidates should not be less than fourteen years old, and should have an elementary knowledge of Latin and French, and some acquaintance with mathematics. The results of the teaching, however, were at first

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disappointing, owing to the want of general culture displayed by the students; and in 1801 it was decreed that candidates for admission must have passed through the greater part of the course of instruction provided by the gymnasium. Gradually the curriculum was extended and raised in standard, and the conditions of admission were made more severe. In 1876, all candidates who purposed presenting themselves, at the close of their course of studies, for the examination admitting to employment in the State service were obliged, on entering the school, to hold the Certificate of Maturity of a Gymnasium or a Real-schule of the first grade (see p. 83). Certificates from schools of a lower grade were accepted from those who did not intend entering the service of the State. At this date the school was under the direction of the Minister of Commerce.

The Industrial Academy, on the other hand, originated in a technical school founded in 1821, for the purpose "of providing young manufacturers and mechanics, not only with general culture and an insight into the things which it is necessary for every artisan to know, but also with as much preliminary knowledge as is requisite for the ordinary carrying on of a technical trade." The conditions of admission were much the same as those for the Architectural School, but the candidates had to be not less than twelve and not

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more than sixteen years of age. The school opened with thirteen pupils and four teachers. In 1850 the limits of the age of admission were raised to seventeen and twenty-seven, and the certificate of a secondary school was demanded for admission. In 1866, by a royal decree the title was changed to that of Industrial Academy ; and in 1871, owing to the high standard to which it had then attained, it was recognized, by another royal decree, as a technical High School. At this date it also was under the control of the Minister of Commerce.

In 1876 these two institutions resembled one another so closely, in their organization and their aims, that their union was considered advisable by the Government. In the technological branches the Architectural School taught only Architecture and Engineering in its application to structures, and the Industrial Academy only Mechanical Engineering, Chemistry, and Metallurgy ; but in both schools the same teachers were in charge of similar courses of Mathematics and other subjects of general instruction indispensable as a basis for the technological branches. If only on account of this common element, much was to be gained educationally and economically by uniting the two institutions in one building and under one direction. As the former then numbered 1085 students, and the latter 659, it was no small undertaking to provide

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a building of adequate size, and at the same time containing all the necessary equipment for such a wide course of technical studies as would be demanded. As a preliminary step, the two institutions were formally united in 1879, under the title of Technical High School, and the new building was commenced about the same time.

The British Royal Commissions on Technical Instruction stated, in its Report of 1884, that the Commissioners visited the new buildings in progress at Charlottenburg. The cost, they said, "is estimated at £450,000, and when it is remembered that the number of students has been for some years past on the decrease, having fallen from 1400 to 800, the object of this vast outlay is difficult to understand." The Prussians were not, however, making a mistake, as the Commissioners feared. The new school was opened in 1884 with 887 students; during the next year the numbers rose to 1030, and have gone on increasing ever since, until, in 1899, they reached the total of 3428. Being a technical High School, it is under the Minister of Public Instruction, and no longer controlled by the Minister of Commerce.

The growth of the Charlottenburg School has been so rapid that it is difficult for English educational literature to keep pace with it. For instance, the Manchester Technical School—to which, by the way, English educationists are under a heavy

Charlottenburg.

debt for enlightenment on the doings of foreign countries and English needs—sent a deputation to the Continent in 1891, which visited this school. In its report, this deputation observed :—

“The school is said to be arranged for the accommodation of 2000 students. There are now 1600, and this number appears to be in excess of the resources of the staff, as double courses of lectures are being given. The returns for the previous winter session, 1889-90, give 1457 as the total number of regular and occasional students, the former amounting to 1043.* Of the total, 176 are foreigners, 10 of whom are Englishmen. The regular students are distributed as follows :—

Architecture	208
Engineering applied to Structures	210
Mechanical Engineering	358
Shipbuilding	142
Chemistry and Metallurgy	145

The significance of these figures may be best understood by comparing them with the numbers in the respective departments of any English scientific institution of high rank.”

The report then proceeds to give a description of the building, which it describes as “of the most sumptuous character . . . and standing in a woodland park.” “It is,” the report says, “750 feet

* 1063, according to the figures in the following table ; the difference might be satisfactorily explained in several ways.

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long and 294 feet deep, and has three floors above the basement." *

Some of the additions and improvements which

* The following is an extract from the description of the school given in the report of this deputation:—

"There is a Mechanical Workshop connected with the school. . . . Here models, apparatus, etc., are made for use in the Lecture Rooms, and work is done in maintenance of the collections. . . . The Library contains 52,000 volumes, and copies of 230 current technological journals. The issues to students are at the rate of 1000 volumes per day. . . . The rooms are mostly 26 feet wide, and have behind them a corridor 11 feet 6 inches in width. A range of rooms runs along each front and the two ends. Other rooms run from front to back, across the intervening space of 75 feet, as well as two main staircases, thus dividing it into five courts. Four of these are open, but the centre one—75 feet by 75 feet, with an arcade round it—is roofed in, and forms a handsome central hall for the display of large objects, busts, and statues. The chief entrance is wide and roomy. Its vaulted ceiling is carried by eight piers, and right and left of the entrance are model rooms. The administrative department is at the rear, on the first floor. There is also, on the first floor over the entrance, a fine 'Aula' or Hall, for State occasions, the Award of Prizes, etc., which is 88 feet by 56 feet.

"A magnificent Library, 150 feet by 26 feet, and a Reading-room, beautifully fitted up, 87 feet by 26 feet, are on the second floor. There is, in the Library, a gallery formed of iron grids laid on girders, to give access to the upper ranges of books. The whole of the remaining rooms are disposed as class-rooms, lecture-rooms, professors' rooms, etc.

"The Chemical Laboratories are carried on in a plain building of stone, separate from but near to the Technical High School, and under its general direction.

"The building is 219 ft. by 199 ft., three storeys high, with a front and rear range of rooms, and three cross wings enclosing two courts.

"There are five Inorganic Laboratories for 83 students; three Organic for 63 students; two Technical Laboratories; besides several private Laboratories for the teachers."

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have been made since their visit may now be mentioned. In 1891 the need for electrical instruction had become so great that courses were established on "Telegraphy, with special relation to the direction of railways;" courses on other branches of electrical technology were started in 1892 and 1897. In the latter year special classes were started on Shipbuilding. In 1897 and 1898 the sum of £7500 was spent on the additional equipment of the Electro-Technical School necessitated by these new classes. At the same time a new Lecture Hall to seat 300, and a new Laboratory to accommodate 350, were built. In 1895 an Electro-Chemical Laboratory was built, at an expense of about £8000. In 1896 a Laboratory devoted to the purposes of Mechanical Engineering was erected at a cost of £8045. In 1898 the task was commenced of lighting the building by electricity, at an estimated cost of £11,350. So great had become the number of students attending the Mechanical Engineering section, that it became necessary in 1898 to erect a provisional Lecture Hall, to seat 400 persons; and in 1899 it was proposed to enlarge the whole building, at a cost of over £50,000. The department of Naval Construction has received special attention, and now numbers 240 students; £1500 was spent on its improvement in 1899. In 1897 a large lecture room for Experimental Physics was

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built, at a cost of £3200. In 1897 £1100 was expended on the improvement of the Machine Testing Section. The sums here mentioned as having been actually spent amount to over £40,000, which does not represent the total expenditure on the improvement of the Charlottenburg School since the deputation visited it in 1891.

In the winter session of 1897-98 there were attached to the school 325 professors, lecturers, and assistants, and 55 private tutors, thus showing an increase of 239 in the first division and 25 in the second since the visit of the Manchester deputation.

The balance-sheet of the school shows, in 1900, an income of £21,290, and an expenditure of £55,300. The difference is paid by the State. A student's fees amount roughly to £15 a year.

If there is any connection between technical education and industrial prosperity, the progress which has been made by the Charlottenburg Technical High School during the last ten years—a progress with which other similar institutions in Germany have kept pace—must, indeed, strike dismay into those who fear for the industry of England. During this period we can point to no similar progress in any one institution. We have been content to spend our resources on that kind of technical education which does not demand preliminary

Conditions of Admission.

training in the secondary school. But the one thing that is necessary to obtain admission to the German Technical High School is the certificate of maturity of a Gymnasium, Realgymnasium or Oberrealschule, that is to say, evidence of having passed through a nine years' course of secondary education, and of having, in the opinion of the appointed authorities, duly profited therefrom. It is only on such a basis as this that it is possible to acquire that higher scientific training which Germany believes to be essential for the development of her manufacturing industries. It is needless to say that we cannot succeed in providing such training until we have provided the basis. In this matter, at any rate, whatever explanation may be offered for the differences between the English and German branches of education, we are nearly fifty years behind Germany ; or, in other words, if we follow at the present rate that line of development which we have adopted, in about fifty years from hence we shall have higher technical schools, as advanced as are to-day those which Germany possesses. To what standard the German schools will have then attained no one dare venture to prophesy. But, of course, this calculation altogether ignores the fact that it may be impossible for us to maintain our industry—one of the greatest sources of our wealth—against foreign competition, if we lag behind in our education for

Statistics of Technical High Schools.

that length of time. It would therefore appear that there is very urgent need of our adopting the plan which was proposed by Matthew Arnold many years ago, and of our providing the basis for higher technical education by organizing our secondary education.

The following table gives some details as to the other Technical High Schools of Germany :—

Town and County	Date of Founda- tion.	Number of Students in 1896	Expendi- tures.
Aachen, Prussia	1865	363	£12,509
Berlin, Prussia	1799	2,693	61,559
Hanover, Prussia	1831	1,101	21,676
Munich, Bavaria	1827	1,757	24,410
Dresden, Saxony	1828	905	23,046
Stuttgart, Würtemberg	1829	910	17,574
Karlsruhe, Baden	1825	996	21,420
Darmstadt, Hesse-Darmstadt.	1826	1,178	21,991
Brunswick, Brunswick	1745	399	10,418

That the State has been able to bring, through the Technical High Schools, the highest scientific knowledge and training to bear, with such marvellous and startling results, upon the promotion of national industry, is due mainly to its careful selection of the fittest, or rather rejection of the unfit, in the secondary and other stages. It is hardly necessary to point out that the selection of the fittest in the different stages of education would be impossible, if the whole system were not under

Technical Education and Instruction.

the control of an enlightened Ministry of Education—enlightened in the sense that it is not composed of men possessing clerical ability alone, nor even of those who owe their appointment merely to a brilliant academic career, but of men who have distinguished themselves in the teaching profession itself.

Owing to this process of selection, there is evidently a large number of individuals who leave the State system at the elementary stage; that is to say, at the age of fourteen, when they have reached the limit of compulsory education. And it must not be imagined that, because Germany has perceived the value of the highest kind of technical education—with a foresight of which neither England nor France seem to be possessed—she has on that account neglected to provide instruction for those who are to be the privates and non-commissioned officers in her industrial army. It is true that, with her deep appreciation of the scientific principles underlying education, she has drawn a sharp distinction between education, in the fullest meaning of the term, and instruction.

Education, as we have seen, is concerned with the period of adjustment or dependence. As the lower animals develop more rapidly than man, and consequently reach the stage of complete adjustment at an earlier age, so among men, those who possess a lower order of intelligence develop more

Technical Instruction.

rapidly mentally, within their own narrower circle, than those who belong to a higher order. Consequently the stage of complete adjustment to, and therefore of self-dependence in, their more restricted environment is attained by such people at an earlier age. For them, accordingly, education* is no longer necessary, or indeed possible. They may, however, naturally benefit from further courses of instruction.

Making allowance for the failings common to all human government, Germany has adapted her educational system to the above conditions, certainly more wisely and consistently than any other nation. Honestly endeavouring in the interests of the nation to make the most, irrespective of class distinctions, of the intellectual forces of her people, she has spared no expense to provide an education unequalled in any country in its adaptation to the intellectual development of her children. And she has done this although, or perhaps it would be more true to say because, she is poor compared with her foreign rivals. Outside her State system of education, and apart from it, she has provided—generally through the Ministry of Commerce and Industry and local initiative, rather

* It is hardly necessary to say that throughout the whole of this work the term education is used, except when otherwise stated, in its narrower sense, as referring to that part of education which can be provided by the school.

Continuation Schools.

than through the Ministry of Education and the Central Government—courses of supplementary instruction for those who have attained to self-dependence at an earlier age than their more highly endowed countrymen.

An Imperial Law, affecting all parts of Germany, forbids the employment of children under seventeen in factories and workshops. Hence arose a need for continuation schools, in which children leaving the elementary school at the age of fourteen might not only be prevented from forgetting what they had already learnt, but might be taught how best to use the knowledge they had acquired for the purposes of practical life. The Imperial Law on the "Regulation of Industry" of 1891 decreed that the masters in any branch of industry were bound to allow their workers under the age of eighteen to attend an officially recognized continuation school (technical or non-technical), for the time fixed as necessary by the authorities. Further, by the same law, it was ordained that the Local Council might make such attendance at a continuation school obligatory, for all male workers under the age of eighteen. There is consequently a great variety of educational effort in this direction in different parts of Germany. In the case of the kingdom of Saxony, the State has made attendance at the continuation schools compulsory, and

Continuation Schools.

several other States have followed the example of Saxony.

The Saxon system is, in this section, perhaps the most efficient and the best organized. Here there are two kinds of continuation schools, those providing technical instruction, and those which offer a continuation of general education—a general course in which the practice of any trade or profession is not taught.* In the first volume of the English Education Department's "Special Reports on Educational Subjects," Mr. F. H. Dale has given an admirable description of the continuation schools of Saxony. His report does not seem to have received the attention which both the subject and his treatment of it deserve. The following account of these schools is based mainly on the information provided by Mr. Dale.

The Saxon authorities believe that compulsory attendance is essential in the case of these continuation schools. "Boys of the poorer classes cannot be expected," says one of the leading German authorities on this question, "at the age of fourteen, when just free from the elementary school, to see by their own unaided intelligence, the advantages of continuing or reviving their knowledge." And, adds Mr. Dale, "the growth

* And in this connection it must be remembered that the provision for secondary education is not as great, in proportion to the population, in Saxony as in Prussia.

Compulsory Attendance.

of trade, the improvements in the manufactures on the one hand, the importance of the mass of the people in the Government on the other, both demand an increased intelligence and a wider knowledge ; and such knowledge can no longer be confined to a few ; it must be made universal, as universal as work and the right of voting ; and continuation schools can alone supply this defect, otherwise irremediable."

There are many reasons why the same difficulty is not experienced in a German State as would be encountered in England, in making attendance at these schools compulsory. Where the necessity of discipline, more particularly on behalf of the military defence of the Fatherland, has been admitted by all classes of the people, and where the State has shown itself competent to provide this discipline in such a way as has led to a great increase of national prosperity, it is natural that the people should be willing to surrender for a period their right to independent action, in favour of new disciplinary measures instituted by the State. But here again we are brought face to face with the fundamental reason for Germany's success in building up a national system of education. External opposition has taught her to place love of country before that desire for individual liberty, based on what must be called love of self.

Hours of Attendance.

These continuation schools come under the control of the local or district council, and therefore adapt themselves, as it is necessary that they should, to local needs, which may be either agricultural, commercial, or industrial. The schools in the country districts, which do not directly affect the question with which we are dealing in these pages, are generally open for half the year only; the summer being a busy time for all engaged in practical occupations. In about two-thirds of all the schools, however, instruction is given throughout the whole year; the minimum number of hours which they must devote to instruction is fixed by law at two per week; but it may be raised to as much as six. As showing that factors enter into foreign education which are strange to English people, it is interesting to notice that either the evening of a week-day or Sunday may be used for instruction in the continuation schools. As a matter of fact, nearly half the schools in Saxony use the Sunday, though they may not employ hours which would interfere with the attendance of the pupils at Divine service. But, with regard to the hours of instruction, the greatest consideration is shown to the requirements of the different trades. Mr. Dale tells us that at Zittau, for instance, "the scholars are for the most part first divided into classes according to their trades, and then, by agreement with the

Subjects of Instruction.

employers, a convenient time is fixed, different in each case, *e.g.* locksmiths attend on Monday, from one to four; those employed in hardware business, on Tuesday, from one to four; butchers on Tuesday, from two to five, etc." A number of these schools charge a fee varying from one to six shillings a year.

As to the nature of the instruction given in these schools, the Saxon Ministry states in its syllabus that "the instruction in the continuation schools should fix and widen the knowledge won in the primary school; it should enable the scholar to perceive the direct relation of this knowledge to his daily life, and teach him to apply it in his calling as a workman."

It is owing in a very large measure to compulsory attendance, that this aim can be achieved; for experience has taught us in England that the majority of boys do not awaken to an appreciation of the benefits of the continuation school until they have reached the age of twenty, when they have forgotten most, if not all, of what they learnt in the primary school seven or eight years earlier. In Saxony, however, the continuation school, in the full significance of the term, is a reality, and does not only exist in codes and blue-books. The district council is allowed to select the subjects of instruction, and there is now no code enforcing uniformity. At Leipzig,

Subjects of Instruction.

indeed, employers of pupils are invited to sit on the school committee, and help the teachers with their advice. In every case, the instruction is adapted to the special requirements of the district. We have, in short, in these schools a happy compromise between the utilitarian, or "practical," and the educational idea. For instance, the Saxon code points out the lamentable want on the part of masters and foremen, who have money under their charge, of business habits and training. To correct this, the teaching of arithmetic, for instance, in Leipzig, is carried out with a view to the future practical needs of the pupils; the examples taken always treat of sums of money and the currencies which may be reasonably supposed to be common in the trade. To quote again from Mr. Dale's paper: "I heard," he says, ". . . a teacher explain to the boys the method in which they might learn from the newspaper what was the current rate of interest for money, and the use of banks as the best loan offices. Nobody, I think, could question the value of this information to boys who might some day be small tradesmen, or doubt how often the lack of such knowledge has offered facilities for extortionate usury."

The syllabus may also be quoted of the lessons on the general nature of the carpenter's trade, planned for one of the classes at Leipzig.

Specimen Syllabus.

First Year.—Easter to Whitsuntide.

(a) Kinds of timber used in carpentering ; the parts of a tree-trunk. A short description of a tree (yearly rings, the bark, etc.).

(b) The physical and technical qualities of timber (its external form, specific weight, hardness, texture, smell, colour, etc.), illustrated by timber used in Germany.

Whitsuntide to the Summer Holidays.

(c) The various kinds of flaws in timber : how distinguished.

(d) The insects injurious to timber.

Summer Holidays to Michaelmas.

(e) Description of the most important kinds of timber used for carpentering purposes (the larch, cypress, cedar, etc.). With the description of each its price was given ; the countries, mountains, etc., chiefly noted for its growth, and the most important towns which employed it in manufacture, were mentioned.

(f) The instruments employed to bind together parts of the timber (clamps, nails, etc.), and their prices.

(g) The materials useful for beautifying the surface of timber (oil, cement, etc.), and their prices.

Michaelmas to Christmas.

(h) The principal tools and machines employed in woodwork, how long they should last, and their price ; the strength necessary for working them ; the space they occupy, etc.

Specimen Syllabus.

This lesson was accompanied by a visit to the Exhibition of Industrial Appliances and Products (Gewerbe Ausstellung).

Christmas to Easter.

(i) Erection of a workroom for five men (space required, ventilation, lighting, division of the tools, machines, etc.).

(k) A few points from the history of the growth of the trade. The system of apprenticeship, and of guilds. The movement for the freedom of the workers. The most important regulations from the laws as they exist at present on the position of the workmen.

Second Year.

For this year no detailed programme is given :

"It was devoted," says the syllabus, "to the more special points concerning the trade ; especially to questions involved in the starting of a business for one's self. In this connexion were mentioned the need for raw material (its mass, weight, price, according to the magnitude of orders to be executed), the time necessary under various imagined conditions, the number of assistants to be employed, the customary wages, the fixed and circulating capital required, etc."

It must be repeated that the instruction in these schools is in no way technical in the common acceptance of the term. There is no practical work done by the pupils. The aim of the instruction is, again to quote Mr. Dale, "to give the boys information on points likely to be

Statistics of Continuation Schools.

exceedingly useful to them, especially in the case of a wish to start in business themselves; and these details, *e.g.* the relations of master and employé, the cost of a workroom, its proper fittings to correspond with a certain amount of capital, etc., would hardly, if at all, be touched upon in a school where the cultivation of manual skill is bound to be the chief object." How far instruction of this nature is considered more useful than practical instruction for this special class of pupils may be shown from the fact that in 1895-6 Saxe-Weimar had 452 continuation schools of the general type, with 5152 scholars, but only 26 technical schools with about 2000 students. The following table* shows the proportion of the population passing through the continuation school in some of the German States:—

NUMBER OF PUPILS IN CONTINUATION SCHOOLS TO EVERY
1000 INHABITANTS.

Württemberg	50	City of Bremen	10½
Baden	35½	Schwarzburg-Rudolstadt .	8½
Hesse-Darmstadt	34½	City of Hamburg	7½
Saxony	28½	Brunswick	7
Waldeck	22½	Mecklenburg-Schwerin ...	7
Coburg-Gotha	22½	Prussia	6½
Saxe-Weimar	22	Saxe-Altenburg	6
Saxe-Meiningen	21	Lippe	5½
Schwarzburg-Sondershau-		Anhalt	5½
sen	20	Oldenburg	3½
City of Lubeck	18	Schaumburg-Lippe	2½
Mecklenburg-Strelitz	14½		

* Based on statistics given in the "Report of the American Commissioner of Education for the year 1898-99."

Technical Instruction.

We now come to that section of technical and commercial instruction which in England may be said to be regarded as more important than the highest technical education. This, at any rate, is a fair inference from the fact that it is the only section to which we have devoted any special attention, and that to which almost the whole of the public moneys devoted to technical education are applied. The chief thing that Germany has to teach us in this branch is that she does not consider it of as great importance as the highest scientific education such as we have seen is given at Charlottenburg.

The Gewerbe Schulen are found only in the large industrial centres. They are chiefly schools of design, having both a day and evening department, in which drawing and mathematics occupy three-fifths of the time-table. Most of the students are apprentices, so that, though the schools have no workshops, it continually happens that a master workman encourages his apprentice to make models in the shop applying the principles or ideas which he has learnt or developed at the school. Side by side with these institutions are to be found trade schools, in which trades and industries are actually taught. A higher class of this type of school is seen at its best in the magnificent textile school of Crefeld, for an excellent account of which we are again indebted to Manchester educationists. This institution

Crefeld.

possesses an evening and Sunday department, as well as a day school, most of the students in which have passed through the modern secondary school. In this instance, as in many others, Germany may be said to beat us on our own ground. Indeed, so complete a training is here given in every branch of weaving, dyeing, and finishing, that not a few Englishmen who have visited this school, and go no further, are under the impression that it provides the highest kind of technical education to be found in Germany.

The fees for day students vary from £6 to £9 in a session. It is a significant fact that a large proportion of the pupils attending these trade schools have passed through the Ober-realschule or highest grade of modern secondary school. The Manchester Committee relate one fact in connection with the Crefeld school which should be brought to the attention of those who would leave everything to local initiative and are opposed to any form of central control. In its report the Committee says :—

“It is interesting to note with what discrimination and judgment the educational authorities of Prussia pursue their objects. The authorities at Crefeld were anxious to see the establishment, as a development of their school, of a department for cotton spinning; but the Royal authority declined to give effect to the representations made, and expressed their determination to build and

Crefeld.

equip such a school in the centre of the cotton industry at Gladbach (also in Rhenish Prussia). There are no less than thirteen schools in Prussia devoted to textile training, each with its own peculiar conditions. This enables a certain elasticity and variety of methods to be established and tried, and the evils of undue educational competition and rivalry, which are to be found in England, and which go so far to prevent the establishment of really efficient institutions attended by competent students, are obviated."

This section of German technical education has occupied so much attention in England that there is no excuse for dealing with it here at any length. Mr. James Baker has lately published, under the auspices of the Board of Education, an interesting account of the impression created by these schools on an Englishman who is neither an industrial nor an educational expert—and to whom, therefore, certain points of organization and aim may not be apparent—but who is not inflicted with that kind of patriotism which closes the eyes to the dangers threatened to England by the rivalry of Germany. The following table * will give some idea of the extent of the continuation school system in all its branches :—

* Based on statistics given in the "Report of the American Commissioner of Education for the year 1898-99."

STATISTICS OF CONTINUATION SCHOOLS IN PRUSSIA AND STATES OF THE GERMAN EMPIRE.*

	Number of inhab- itants.	General Con- tinuation Schools.		Industrial Continuation Schools.		Trade Schools.		Commercial Schools.		Agricultural Schools.		Schools for Girls.				Total.	
		No. of Schools.	Pupils.	No. of Schools.	Pupils.	No. of Schools.	Pupils.	No. of Schools.	Pupils.	No. of Schools.	Pupils.	General.		Special.		No. of Schools.	No. of Pupils.
												No. of Schools.	No. of Pupils.	No. of Schools.	No. of Pupils.		
Kingdom of Prussia—	31,855,123	12	8,718	1,320	145,672	97	8,625	217	17,029	1,193	23,831	26	4,011	124	11,604	2,989	219,490
Bremen ...	196,278	—	—	4	1,669	4	110	2	343	—	—	—	—	—	—	10	2,122
Hamburg ...	681,832	—	—	4	2,319	11	1,224	3	858	—	—	—	—	1	480	19	4,881
Lippe Detmold ...	134,617	—	—	6	722	—	—	—	—	—	—	—	—	—	—	6	722
Anhalt ...	293,123	—	—	17	1,393	1	10	3	137	—	—	—	—	—	—	21	1,540
Saxe-Coburg-Gotha ...	216,624	152	3,720	3	368	3	256	3	182	—	—	3	317	—	—	164	4,843
Saxe-Altenburg ...	180,012	11	482	5	350	1	126	1	50	1	50	1	15	—	—	20	1,073
Saxe-Meiningen ...	233,572	298	4,199	1	200	2	67	3	89	2	98	14	202	2	47	322	4,902
Brunswick ...	433,906	1	250	11	1,734	2	261	4	214	1	50	1	139	2	178	22	2,826
Oldenburg ...	373,662	1	50	8	480	6	290	1	50	7	277	—	—	1	20	24	1,167
Mecklenburg-Strelitz ...	101,513	—	—	9	711	1	736	1	14	—	—	—	—	—	—	11	1,461
Mecklenburg-Schwern ...	506,883	—	—	45	3,250	1	620	8	164	3	52	—	—	2	40	59	4,136
Saxe-Weimar ...	338,887	452	5,152	10	1,552	7	332	5	226	2	90	2	46	—	—	478	7,398
Hessia ...	1,039,388	905	25,268	81	8,322	6	654	7	865	11	307	2	115	4	184	1,010	35,716
Baden ...	1,725,470	1,591	25,649	106	8,390	12	1,099	17	1,500	21	567	†	16,717	154	6,804	1,901	60,816
Württemberg ...	2,080,868	2,079	31,176	169	15,592	6	1,070	14	1,938	22	366	2,093	51,087	37	2,929	4,420	104,128
Saxony ...	3,783,014	1,943	76,994	39	10,660	112	10,119	40	4,871	11	691	7	1,596	18	2,445	2,170	107,376

* Only States with population of over 100,000 are given.

† The number of these schools is contained in the number of schools for boys.

Commercial Education.

It will be seen that a considerable number of schools in the above table offer commercial instruction. From what has been said above, as to the nature of the continuation school, it may be inferred that the commercial instruction provided is not of a very technical kind. Speaking of these commercial schools at the Congress on commercial education held at Antwerp, in 1898, Dr. Stegeman, who has done much for the promotion of commercial education in Germany, remarked—

“Their aim is to give to future business men, while they are undergoing their apprenticeship, a certain amount of theoretical knowledge as a complement to their office work. This is not their sole aim, however; their chief function being to perfect the knowledge which has been gained in the elementary school. It is said in Germany that a young business man, whose elementary information is imperfect, who cannot write or speak his mother-tongue correctly, who cannot calculate rapidly and accurately, who does not write a good and legible hand, and who has not some general notion of the nature of the earth's surface, is not fit to be in business.”

There has recently been a certain agitation in Germany for the provision of a more specialized type of continuation school, and various commercial societies seem to favour their promotion. But for the training of business men Germany still depends, and, as far as it is safe to

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prophecy, will for a long time to come continue to depend on her Realschulen. Mr. Michael E. Sadler, in his report on higher commercial education,* remarks in this connection that his inquiries have convinced him that the world has only begun to taste the effects of the *first-rate* non-classical secondary education now given all over industrial Germany. He adds—

“The commercial advance of the German Empire, so striking to any visitor to that country, is due to a combination of causes. But one of these causes is the extreme intellectual efficiency of the secondary schools and of the higher technical institutes. The Germans do not mix up these two grades of educational work. The secondary school is organized as the foundation, the higher technical institute as the crown. It is to the non-technical secondary schools and to the highly specialized technical institutes, far more than to the elementary schools or evening continuation schools, that those should look who desire to trace the *educational* causes of the commercial progress of the German Empire.

“German non-classical secondary education prepares a boy to excel in commercial life, but it is not commercial education in any narrow sense. Indeed, the German secondary school authorities rigidly abstain on principle from any attempt at premature specialization in commercial subjects.”

* “Special Reports on Educational Subjects,” vol. 3, pp. 554-626. This report, if widely read, would finally dispel the many errors which have arisen in England concerning the question of commercial education.

Germany and Premature Specialization.

So much has already been said as to the German appreciation of the scientific principles on which education is based, that it is hardly necessary to remark that the theories put forward by some of the English advocates of commercial education do not find favour in that more enlightened land. Least of all does Germany show any sympathy with that desire, too prevalent in some quarters, to build up a secondary system of commercial education which will turn clever boys into cheap clerks. A country which has looked far ahead, and seen the ever-increasing intensity of international competition, will have learnt that it must strain every nerve to prepare for future struggles. It will see clearly that it cannot afford to pander to the selfishness of individuals, but that it must have a single eye to the interests of the whole nation. Ultimate victory does not await the country which possess only one or two exceptionally brilliant men ; it will be slowly and painfully won by that nation which can command the greatest collective force. The fate of a people therefore—whatever be its form of government—depends upon the extent to which it cultivates the powers of each individual unit, and on the degree in which it is capable of combining and directing the individual forces, with economy and with foresight, towards the aim of national prosperity. And where it is recognized that each individual must be

No Encroachment of Commercial

developed to the highest possible realization of his capacities, we may be sure that the schools will not fail to adopt those methods of education which are sanctioned by scientific laws.

In such a country there will be no need to catch the soaring ambition and divert it from the pursuit of social attractions—unless it be that, as in France, social ambitions have dimmed the national purpose; there will be no desire to stunt the natural development of the clever lad in order that he may become a “ready reckoner” of unflinching accuracy, or a commercial machine of unerring precision—unless it be in a country where economic freedom has produced a too rapid accumulation of wealth and has supplanted the old ideals of humanity, the ideals which enforced the obligations of the strong to the weak, though they made but little account of individual liberty fenced round with hereditary rights or fortuitous privileges.

While, therefore, providing the best kind of modern secondary education that can be devised for aiding the adjustment of the individual to his future environment, Germany has not allowed “commercial education” to encroach on the sphere of secondary education. That is to say, she has refused to listen to those who may have said: “Here is a secondary school supplying a distinct demand and attracting a certain number of boys.

on Secondary Education.

Let us increase its popularity by altering the course of studies in one of its sections, so as to teach boys things which will be of practical and immediate use to them when they enter business life. All subjects are of equal educational value if properly taught, therefore, surely it is better to teach those which are useful." If such arguments have been used in Germany they have found no response in educational circles. For Germany has not placed her headmasters under the temptation of increasing the number of their pupils by the addition of garish attractions to their curricula ; a temptation which has often been offered in England by making the headmaster's salary largely dependent on capitation fees. But, on the other hand, approaching all educational problems in a methodical spirit and with a full appreciation of at least the axioms of educational science, her experts, whose opinion is supreme on educational reform, have provided a secondary education admirably suited to train a boy for the future surroundings of business life. But this education does not fail to cultivate those special qualities which are essential to the proper performance of a citizen's duties. In short, there is probably no country which has produced a school so admirably fitted for this purpose as the Real-schule described above.

This type of school is as different from the

Methods of Instruction.

commercial branch, which has been added to some of our secondary schools, as it is from the school of science, which has been created out of the modern side of others of our secondary schools, on the plea of providing a proper preparation for industrial life. But while it is undoubtedly untrue that the educative value of a subject depends entirely upon the way it is taught, or that all subjects are intrinsically of equal educative worth, it is equally false to assert that methods of instruction do not play an exceedingly important, perhaps the most important, part in the work of education. As has been already pointed out, the work of the educator is to guide the child during the process of his adjustment to his surroundings. He guides this adjustment to a very great extent by means of instruction; and, therefore, instruction must conform to the laws controlling the natural course of development. This is evidently as essential in intellectual as in physical matters, though the baneful effects of premature specialization in physical training are more apparent to the superficial observer than in the case of intellectual training. It is consequently evident that methods of instruction, and particularly the manner in which new knowledge is arranged and graduated and presented to the pupil, are of the utmost importance, not only in consideration of his general education, but also—in a minor degree which will

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appeal strongly to those who place practical requirements before scientific laws—with regard to his proper assimilation of this knowledge ; or, in other words, with regard to his so acquiring it that “he makes it his own,” and can use it for practical purposes. It cannot be too strongly emphasized that methods must conform to the natural laws of development ; and the intellectual “short cuts,” invented by charlatans, are as much to be feared as the nostrums with which they endeavour to accelerate natural processes in the physical realm.

A strange fact, which explains many things, may here be noticed. While we still believe that the best way for an educator, who is employed in anything higher than an elementary school, to learn to educate is to practise for a year or two unaided, uncontrolled, and often without even supervision, on the souls and minds and bodies of children, Germany has for nearly a hundred years insisted that he should pass through a course of thorough preparatory training. In the case of teachers in secondary schools, the State has determined what evidence they shall give of their qualifications before entering their profession. In Prussia, for instance, no one is recognized as a fully qualified secondary teacher until he has passed through the course of training prescribed by the State. He is not admitted to this course

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unless, after having studied for three years at a university, he passes an examination conducted by a commission appointed by the State. In this examination he must prove that he possesses those attainments in scholarship without which he would not be qualified to teach the subjects which he has selected. But in addition to satisfactory attainments in scholarship, he has to satisfy the examiners that he also possess general culture, which is essential to every educator, together with a certain preliminary knowledge of the science of education. It is stated in the syllabus for this examination that the candidate must (1) give evidence of a knowledge of the general principles of philosophy (ethics and psychology) and of pedagogy ; (2) that he must show that he possesses that command of his mother-tongue, and familiarity with his national literature and history, without which no one can claim to be a man of sufficient culture to hold the position of master in a secondary school ; (3) that he must satisfy the examiners that he has given serious reflection to the principles of the religious teaching of the church to which he belongs. Though three years' study at the university is insisted on, the taking of a degree is not essential for admission to the profession. Indeed, one occasionally meets headmasters enjoying no small reputation, who cannot boast of a university degree.

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The passing of the State examination constitutes a young man an officially recognized candidate for the teaching profession. It is important to notice that in Germany, as in France, all such examinations consist of an oral as well as a written part. The candidate has, since 1890, been compelled to devote two years to his professional training. The first is what is called the seminary year, and the second the year of probation. During the first of these years, the candidates are placed in charge of the directors of specially selected secondary schools, from four to six candidates to each director. Here they generally spend the first part of the year in attending lessons, at which they take notes, meeting afterwards to discuss and criticize them with the teachers. In the latter part of the year, they teach under guidance and supervision. Besides this, they take an active part in the general life of the school, and learn all that can be learnt in such a way about school organization and curricula. They also pay visits to the neighbouring elementary schools and training colleges for primary teachers.

While the first year is thus given to the theoretical side of training, during the second year the candidate begins to put what he has learnt into practice. As a probationer, he now is attached to the school staff. For the first quarter of the year

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he teaches under constant supervision, and even after that the director, or an officially authorized master, must be present at his lessons at least twice a month. Towards the end of this year, he draws up a report on his own teaching ability and the progress which he thinks he has made ; this, together with the report of the director, is submitted to the local authority (the Provincial Board of Inspectors), which decides as to the candidate's competence as a teacher, and consequently his fitness to enter the profession definitely.

Though these regulations may appear somewhat stringent, they are in practice carried out in such a way as to allow the greatest freedom possible to those who are in charge of the candidate's training. The points to be noticed are, that in Prussia a young man is not allowed to enter the teaching profession without serious preparation, that he is not allowed to try his prentice hand on the pupils without supervision, and that he is not even admitted to the preparation for the profession until he has devoted some time to the study of the sciences underlying the theory of education. It is thus that Germany ensures the employment of the best methods of instruction in her secondary schools. She has at least discovered that efficiency of teaching, that is to say, the efficiency of the teachers, is the first thing necessary for the success of any system of schools. When we take it into

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account that teachers so qualified are employed in the Realschulen, we cannot be surprised that these schools achieve wonderfully good results.

Of the actual knowledge possessed by the boys who have passed through these schools, that which strikes an Englishman most forcibly is connected with modern languages. To the teaching of no subjects has Germany devoted greater attention during the last fifteen or twenty years. In England, also, the question of modern language teaching has excited recently a good deal of attention. But while we have devoted our energies to trying new plans, which anybody may have been kind enough to suggest, for learning languages in an impossibly short space of time, the Germans have brought the expert knowledge, based on scientific thought, of the secondary teacher to bear on the solution of the problem how best to teach modern languages. The German experts are not agreed, as Lord Salisbury would tell us experts never are; but their disagreement has resulted from the rivalry of excellent solutions, none of which can claim to be the only true and right one. The practical consequence has been, however, to give an extraordinary stimulus to modern language teaching throughout the whole land. Every business man in England knows what a mastery Germans have of their own and often of other foreign tongues; but there are few who know that the Germans speaking

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with authority on this subject admit that this mastery is not due to any natural aptitude peculiar to the German people. It is, in their opinion, to be traced entirely to the methods of instruction employed in the schools. In fact, those Germans who have carefully studied the question, state that an English boy taught by the same methods arrives at equally good results.

Perhaps in connection with the teaching of modern languages in Germany, I may be allowed to quote one instance, which came under my own observation, of the wonderful results obtained by a scientific method. In August, 1897, I visited a school which had adopted the Frankfort reformed curriculum (see p. 97); the lower second class, in which the average age of the boys was about fourteen, had begun English the preceding Easter, and were receiving a lesson a day in this subject. They had just returned from their summer holidays, but I found that they had forgotten little of what had been taught them in the preceding term, and had already a very remarkable knowledge of the elements of English. In the following January I visited this school again. The boys of the class referred to had made extraordinary progress. I spoke to them in English for half an hour, chiefly in connection with the subject of their lesson, and found little difficulty in making myself understood by the great majority

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of the class, and obtaining intelligent replies in English. This is not the place to discuss in detail the method which was employed in this school ; but it is certain that such results could not be obtained by any but trained teachers or in schools which were less perfectly organized.

A word may be said as to the German teacher of modern languages. In the first place, he is invariably a German. The authorities are satisfied from experience that a trained German teacher is able to obtain much better results from German boys than a foreigner. That the German's "accent" in speaking French and English may not be perfect is admitted ; but, then, the authorities do not live in the vain hope, indulged in by the English parent, that a boy or girl will acquire at school a perfect foreign accent. On the other hand, while pursuing no such unattainable ideal, they maintain that even in the matter of pronunciation a German can teach German children better than a foreigner, who is quite unable to place himself at his pupils' point of view. To the training of the modern language teacher Germany has, of course, devoted special attention. Everything possible is done to induce him to visit foreign countries ; in his case, one of the three years which every candidate must pass at a German university may be spent at a university in the country of which he is studying the language. In

Influence of Realschulen.

several large towns, the municipal authorities, knowing how much their commercial prosperity depends on the proper teaching of modern languages in secondary schools, provide scholarships, enabling men who are actually engaged in teaching to spend six consecutive months in a foreign land.

Those who seek for the educational foundations of Germany's past commercial success must study her Realschulen and Ober-Realschulen ; they must consider the way in which she has educated and trained the teachers of these schools ; and, above all, they must ponder the causes which have produced the wide and general modern curriculum which the Government insists that these schools shall adopt. It was of some schools nearer home which Mr. Sadler must have been thinking when, in the paper already referred to, he said—

“To cram up little boys of fifteen with odds and ends of commercial law and generalizations of commercial geography is to waste precious time, which might have been devoted to subjects not only more elevating in themselves, but also more digestible by youthful minds. A school timetable which offers Latin and shorthand as alternatives cannot properly be called a curriculum. It is more like a shop-window, from which the passer-by may choose whatever wares seem to him attractive.”

It is only within the last few years that Germany

Leipzig Commercial High School.

has taken serious steps to provide commercial education of the highest order, and the Germans are still by no means unanimous as to its value. The scheme establishing the High School of Commerce in Leipzig was approved by the Saxon Government in 1898. It is intended that this institution should hold precisely the same relation to commerce as the great technical high schools hold to Industry. Nobody is admitted to his course of studies who has not received a sound general education. Candidates are, according to the official regulations, admissible only if they satisfy one or other of the following conditions :—

(a) They possess the certificate of Maturity of a Gymnasium, Real-Gymnasium, or Ober-Realschule.

(b) They are persons engaged in trade who hold the six years' certificate of one of the secondary schools.

(c) They are students from German Training Colleges, or Elementary School teachers who have passed the second general examination for such teachers.

(d) They are foreigners over twenty years of age who can prove that they possess the required standard of preparatory education.

In the year 1899-1900 there were 275 students in the Leipzig Commercial High School. Of these 21 were 18 years of age, 42 were 19, 45 were 20, 35 were 22, and 23 were over 30. The school

Leipzig Commercial High School.

receives a small subsidy from the Saxon Government, and the Leipzig Chamber of Commerce undertakes all financial responsibility. Educationally it is closely associated with the University, the professors of which have much to do with the organization of the courses of studies.

The school offers two diplomas—one to students who have passed through a course of studies with success, and one to these who had passed a special examination to test their competence as teachers in commercial schools. It is yet too early to attempt to measure the results attained in Germany by the highest kind of commercial education.

CHAPTER V.

THE FOUNDATIONS LAID IN FRANCE.

THE national purpose which we have seen at work in Germany is also to be traced in France throughout the course of the nineteenth century. But the political conditions affecting France during this period have been so different from those which have arisen in Prussia, that it would indeed be strange if there were any striking similarity between the systems of education in the two countries. The dawn of the nineteenth century saw the commencements of a new France, loud in its assertion of the rights of man. "Next to bread," said one of the greatest figures in the Revolution, "education is the first need of the people."

At the commencement of the Revolution, the followers of different philosophers, with their systems, their formulas and their constitutions, first attempted to guide the new democracy rising on the ruin of the old order of things. Voltaire was mainly responsible for the overthrow of the old systems. While, however, his teaching had

Influence of Philosophers.

been chiefly negative, attacking accepted beliefs and recognized systems, Rousseau followed as the creator of beliefs and systems which were to replace those which were disappearing.

It is not intended to suggest that in any country thinkers and philosophers actually control the course of human progress. From time to time men grow discontented with the existing order of things ; the institutions which they have reared fail to satisfy actual needs. Silently they cease to support them—silently because the very forms of speech which they have acquired have been moulded and fashioned under the influence of these institutions. Action—the physical push, so to speak—which will send these institutions tottering to the ground, is impossible until the new language is created, freeing men from the bonds of silence, and enabling them to inter-communicate, to plot, and to devise. At such moments a thinker will arise who finds the new language to express the silent thought. Such a man was Voltaire.

But the inborn tendency to progress will never allow man to be satisfied with mere destruction. Anarchy may reign for a moment, but where man has destroyed he will inevitably rebuild, and the new language is not complete until it is made the medium for expressing, not merely the condemnation of the old, but also the proclamation

Voltaire and Rousseau.

of the new. Hesitating between the ills we have and those we know not of, we grope about searching for some assurance of future amelioration, until silently we perceive a ray of truth illumining possible ultimate good. It shines not for us alone, it is visible to our fellows also. We need but the new language to call to one another across the darkness and above the tumult of the vanishing past: we need but the interchange of thought to give us that union and support of fellowship without which we fear to walk upon the unknown waters. The great thinker, who is the first to speak under these circumstances, will give us the new language; he will express our thoughts for us in words, and thus may seem to posterity to influence us. But we know that when once we have communicated with our fellows, and have found the common purpose in all their hearts, the common perception of the new light in all their minds, we are urged onwards by the force of our own wills.

Voltaire gave to the French the language of destruction, Rousseau gave them the language of creation. With all his paradoxes and false reasonings, with all his baseless assumptions and weak-witted dreams, Rousseau it was who first proclaimed to France the dawn of the new light which she was silently contemplating. He would seem to say, "You have been told that the old order

Rousseau.

of things is hopeless. I will tell you why it is hopeless. Everything is good when it leaves the hands of the Author of nature, but in the hands of man everything degenerates. Throw off, then, the bonds imposed by man; refuse to submit to this overwhelming, crushing, all-enveloping system of modern civilization which has been built up in defiance of the laws of nature; recognize these laws as your sole guide, and enter into the joys which Nature reserves for those who submit to her sway alone." Speaking the new language of Voltaire, the French people overthrew the Bastille. Welcoming the new language of Rousseau, the nation decreed that a statue should be raised to him, resting on a pedestal formed of the stones of the great prison.

The work in which Rousseau consecrated the new language was not the *Contrat Social*, gospel as it was during a certain phase of the Revolution, but *Émile, ou de l'Éducation*. Here he expressed the silent thoughts, at work in all men's minds, which went to the very root of things. Education formed a basis to existing institutions; not that the institutions were based upon an education which conformed to natural laws. Quite the reverse. The institutions, outcomes of an artificial civilization, determined for their own support the nature and aims of education. In 1762, when *Émile* appeared, the institutions still stood erect, it is

Rousseau.

true ; but erect only as a dead man will stand on the field of battle, when the vital power has left him without disturbing the habitual equilibrium. Thinking silently, the people had withdrawn their support from these institutions ; they had only to adopt the language of Voltaire, and to interchange their thoughts, to unite to give the final shock which should send the artificial fabrics toppling to their ruin.

It was not till this had happened that the people—the lower orders — heard the creative language of *Émile*. But the upper classes—the educated classes — heard it immediately, and adopted it. They were waiting expectantly for the lower classes to give the physical push to the hollow institutions ; they themselves gave it to the basis which they regarded as their own peculiar property, education. They had for long thought silently that a system of education was absurd which fashioned children, destined by Nature to be self-dependent, self-active men, for slavery to the all-enveloping institutions which had ceased to command their confidence. And, as Fate would have it, in the very year in which *Émile* appeared, the Jesuits, who reigned supreme over public education, were expelled from France. The new language was everywhere adopted by the upper classes. Even royalty heard it, not recognizing that it proclaimed its own ultimate

Rousseau.

replacement. Expressing the thoughts of others, which could not have been its own, royalty caused the ill-starred prince, who was afterwards to be the victim of the Revolution, to be educated according to the new ideas. This was why Louis XVI. learnt a trade, and why, later on, when a prisoner in his own palace, he found his sole amusement in making locks: "He sends for his smith's tools; gives, in the course of the day, official or ceremonious business being ended, 'a few strokes of the file.'"

Rousseau expressed the general feeling of his time, which revolted against an education designed in support of existing institutions. He proclaimed the right of man to independence, even in his education. *Émile* opens with the statement, already quoted, that "everything is good on leaving the hands of the Author of nature, but in the hands of man everything degenerates." The state of nature being, therefore, preferable to that of civilization, the education of man should conform to the laws of nature, and be a preparation in the fullest liberty for the natural state, rather than an adjustment to the surroundings of his future life and the existing social organization. And it was in his opposition to this latter aim of education that Rousseau voiced most clearly the thought of the upper classes of his time—a thought which spread to the lower classes in the

Two Fundamental Views.

Revolutionary period of the second decade after his death.

The duty of educating man as man, apart from all considerations of social organization, was the thought, expressed by Rousseau in *Émile*, which remained when the other fundamental principles he uttered had been forgotten. And the nineteenth century witnessed in France a continual contest between two views—the one admitting the right of every child, irrespective of his social position, to the fullest education of which he was capable; and the other demanding that education should confirm the existing social organization. We find the one or the other dominating according as the principles of democracy rose and fell. It is thus not a national purpose—in so far as it regards competition with foreign rivals—which we perceive at work in the development of French education in the century which has passed, though, as we shall see later on, such a purpose did play an important part in this development; it is rather a social purpose, directed either towards the promotion of absolute social equality, or, on the contrary, towards the confirmation of class distinctions.

In 1791, at the opening of the Revolution which was to confirm the absolute equality of all men, it is officially stated in the Constitution that: "There shall be created and organized a public

Napoleon.

instruction, common to all citizens, gratuitous as regards those parts of education indispensable to all men." But little more was done than to formulate such principles ; the First Republic was too busy fighting for its existence against enemies at home and abroad, to put its educational ideas into practice.

Napoleon followed with his tyranny of merit, and built up his Imperial University, a body charged with all the public education of the empire. By a decree of 1808 all schools in this organization were obliged to take the precepts of the Catholic religion as the basis of their teaching, and to inculcate fidelity to the emperor, to the Imperial monarchy, and to the Napoleonic dynasty. In 1815 Napoleon was overthrown, and the old monarchy, with its leanings towards the former social system, restored. The Napoleonic educational system was, however, maintained ; but little progress was made in public education, except in so far as the right of any authorized religious association to supply teachers for the elementary schools was recognized by law.

With the accession of Louis-Philippe in 1830 the real work of education, as affecting all classes of the nation, may be said to have begun. This monarchy depended on the support of the middle classes ; and the education of the middle classes, in confirmation of the existing social order, appears

Reign of Louis-Philippe.

to have been the chief aim of the educational development of his reign. The elementary schools were increased, as will be seen from the following comparative tables for the years 1832 and 1850:—

Number of public schools	1832	1850.
„ private „	32,520	43,843
	9,572	16,736
Total	42,092	60,579
Number of pupils (boys)	1,202,673	1,793,667
„ „ (girls)	734,909	1,528,756
Total	1,937,582	3,322,423
Illiterates	47·8 %	35·4 %

But it is when we turn to the education higher than primary that we begin to perceive the social tendencies at work. All nations occupying a foremost rank in modern civilization now give much the same elementary education to the children of the poorer classes. It is not until the secondary stage is reached that we find marked differences between the systems; and it may truly be said that the development of the system of secondary schools marks at present with approximate accuracy the exact rank that a nation holds in civilization. We have seen that in England our secondary system is not yet established. We have also seen in an earlier chapter that, under the leadership of Prussia, Germany has made her secondary schools the centre and support of her whole national system of education. France

Guizot.

offers a very interesting comparison, all the more interesting to us because in what attempts the State has made in England to build up a secondary system, it has followed the example of France rather than of Germany.

The French Minister to whom almost all of the educational reforms of the reign of Louis-Philippe are due is Guizot. Guizot was an historian before he was a politician ; not a mere relator of events, but one who searched for the causes producing events and the lessons they had to teach for future guidance. His historical studies had led him to the conclusion that liberty was essential to the stability of government. But by "liberty" he did not understand the natural freedom of Rousseau. According to Guizot, "liberty is in its essence the simultaneous manifestation and action of all interests, rights, powers, and social elements." In short, it was, so to speak, an equilibrium established among all the rival social forces, a kind of social balance of power. He considered that the whole movement of European history had tended towards the raising up, strengthening, and enriching of a middle class ; and it was on this middle class that the desired equilibrium depended. But it was in the richer middle classes that the real strength resided. His object was therefore to restore the institutions overthrown by the Revolution, not on the democratic basis of the early days

Guizot and the Middle Classes.

of the Revolution, nor on the autocratic basis of merit founded by Napoleon ; neither did he favour the aristocratic views of the two preceding monarchs. The foundation which he considered alone stable was plutocratic. And it was with due attention to the political theory which he had thus formed that he set about the work of educational reform.

Guizot was aided by the fact that there were to be found the same forces at work both in France and Germany, pressing for radical, and what may in a sense be called democratic, reforms in secondary education. But whereas the Germans, full of national enthusiasm, took Pestalozzi, the practical educator, as their guide, the French democrats founded their views on the half-philosophical, half-political theories expressed by Rousseau. And we may therefore expect to find the political, and still further the social, movements of the last century exercising greater influence on educational development in France than in Germany. We find, for instance, the same revolt in both countries against the purely classical teaching of the secondary schools. But the revolt in France is marked far more by its attacks on the social privileges represented by these schools than in Germany. Indeed, it appears as if the broad distinction might be drawn that, whereas in Germany education has been generally expressed in terms of national

French Democrats.

prosperity, in France it has been expressed in terms of social equality. The French democrat had certainly a keen appreciation of the joys of national supremacy, but in internal affairs his main purpose seems not so much to have been to achieve individual liberty as social equality. First he attempted this by abolishing institutions with the privileges they represented ; but then, finding the dead level of general equality unsatisfactory and perpetual motion of the guillotine undesirable, he was ready to accept any institutions which would bestow on him the privilege of equality with those in the highest social ranks. Then rose up a fresh stratum of democrats to abolish these institutions in their turn, and to capture the social privileges for themselves. It was this social unrest and continual changing that Guizot wished to remove. His task would have been hopeless had it not been for that apparent permanency in the actual system of government referred to in an earlier chapter.

That he first of all consolidated and widened the system of primary education may be regarded, not as a democratic step—his ultimate overthrow was due to his stubborn refusal to make any concession to democratic principles—but rather as a recognition of the necessity for the education of all classes of the people according to the positions which they were called to occupy.

Causes of Higher Primary Education.

But where the lower classes are moved by strong desires to attain to equality with the highest social orders, they will invariably endeavour to obtain the right to that education which will admit them to these ranks. With this tendency Guizot, in his desire for social equilibrium, could have no sympathy. Speaking of the gap between primary and secondary education, he said—

“ It is absolutely essential to fill up this gap. A considerable proportion of our countrymen must be given the opportunity of attaining a certain level of intellectual development without imposing upon them the necessity of having recourse to secondary instruction, which is both uncertain in its returns and expensive. Indeed, for the few fortunate men of talent that classical education develops, and removes with profit to themselves from their first surroundings, on how many mediocrities does it not bestow habits and tastes incompatible with the humble station to which they must inevitably return? And because they have once left their natural sphere, they are at a loss by what path to force their way in life, and rarely become other than ungrateful, discontented, unhappy beings, a burden to others and to themselves.”

It was on this account that Guizot founded the system of higher primary education. It is true that when he referred to the unsuitability of the classical secondary education, he was expressing a feeling which also existed in Germany. But, generally speaking, while it appeared necessary

Utilitarianism.

to the French statesman to throw obstacles in the way of the social ambitions which would lead parents to send their children to the classical secondary school, Prussia was considering how she could provide a modern secondary education side by side with the classical school ; not in fear of social ambitions, but because such an education appeared essential to the proper development of a large portion of the nation. This difference, which goes on increasing between the two systems, is a fundamental one, and calls for very special attention from those English educationists who study the schools of the two countries.

It is significant that about this time there was in France a strong opinion in favour of what is called "practical" education, that is to say, education which is strictly utilitarian in its aim. The great self-educated scientist, Arago, expressed this opinion in 1836, in the well-known saying, "You don't make beet-root sugar with fine phrases." It may be noticed, in passing, that similar arguments have been used in favour of the educative value of science as opposed to literature by not a few English educationists within the last ten years.

Guizot's system of higher primary schools met with little success for many years. Without tracing it through all its changing fortunes, it is only necessary here to notice the chief points in its

Growth of Higher Primary System.

historical development. Under Napoleon III., when democratic tendencies were held in check by other means, the higher primary schools were allowed to languish. Considerable progress was, however, made in elementary education, the number of illiterates, which in 1850 was 35·4 per cent., had been reduced in 1872 to 19·1 per cent. At the same time, the State tightened its grasp on the schools, the number of private schools falling from 16,736 in 1850 to 13,866 in 1872. Consequently, the public expenditure on primary education increased between 1865 and 1872 by more than 26,000,000 francs. Private enterprise seems, however, merely to have been turned into other channels, for it is during this period that we find it energetically directed, assisted by public enterprise, to the establishment of adult classes, apprentice classes, and evening continuation schools. These, however, in no way provided higher primary education as originally organized.

But most important of all was the establishment of the modern branch of secondary education in 1865. At this date France was again attempting to realize her dreams of national supremacy in Europe. And it is, therefore, not astonishing to find her attempting to introduce reforms in her secondary education on the lines adopted by Prussia. Had the disaster of 1870 not resulted for

Higher Primary System.

France in a return to a Republican form of government, it is not improbable that the modern secondary school would have thriven and removed all need for higher primary education. But such was not to be its fate.

In 1878 the French Parliament for the first time turned its attention seriously to the higher primary question, and voted 110,000 francs for the salaries of masters and scholarships for pupils in higher primary schools. From then onward these schools have rapidly developed. While in 1878 there were only about forty such schools in France, there were 256 in 1889, besides 431 so-called *cours complémentaires*. It only remains to trace, during the last ten years, their rapid development, based on the Free Education Act of 1880, and the Act of 1886.

The *cours complémentaires* were first of all separated from the higher primary schools, and defined as a one-year's additional course to the elementary school, of which it forms a distinct part. The higher primary school, on the other hand, is, except in a few places, carried on in a separate building of its own, provides a minimum course of two years' instruction, and is under a different director from the elementary school. Three or more years of instruction must be given for it to be recognized as providing a full course. In 1889 there were existing two kinds of higher primary schools—

Higher Primary System.

professionnelles and *non-professionnelles*, the former being under the control of the Minister of Public Instruction, and the latter under the joint control of this Minister and the Minister of Commerce. The result was that the "professional" element was found to predominate in both, that is to say, that special instruction for various occupations was tending to oust general instruction altogether. In 1892, however, a separation between the two types was commenced, and at present they are clearly defined.

There are thus two distinct types of school to supplement elementary education: (1) the higher primary schools, under the Minister of Public Instruction, and (2) the practical schools of commerce and industry, under the Minister of Commerce. Speaking generally, it appears that the Ministry of Commerce has favoured specialization within the limits which we are now discussing, and, as we shall see later, also in higher grades of education; whereas the Ministry of Public Instruction has, as far as possible, been guided in its work by the scientific laws governing the process of education.

In 1890 it was calculated that at least one-half of the pupils in the higher primary schools were destined for agricultural, industrial, or commercial occupations, and at present the proportion is over two-thirds. Discussing the aim of these schools

Higher Primary Schools—

in 1893, the Minister of Public Instruction, M. Charles Dupuy, said, in an official circular—

“Who are the pupils attending them? They are not young people destined for wide careers, having indefinite time at their disposal, and asking from us high intellectual culture; they are children of the working classes, who will require to live by their labour, and, in most cases, by the work of their hands. They do not aspire to classical studies; their ambition and probable destiny is to fill one of the numerous positions of an unpretentious character that agriculture, commerce, and industry offer to workers, with the prospect of attaining, by gradual steps, to a state of moderate ease.

“If this is so, the higher primary school will merely direct its pupils, from start to finish, towards the requirements of the practical life that awaits them; it will not turn their minds for a moment from the pursuit of a profession; it will be careful not to let them acquire habits, tastes, and ideas which will separate them from the manner of life and work for which they are intended. And, while at the same time reminding them that democracy broke down the barriers which formerly restricted so seriously the liberty of the individual, it will try rather to make them love and honour their career than to dream of the means of quitting it.”

He concluded, therefore, that there could be no possible confusion of aim between these schools and the modern branch of secondary education, and he defined the aim of the former as follows:—

and " Practical " Schools.

"The entirely practical and utilitarian character of the higher primary school may be recognized at the first glance: in this general sense it is 'professional.' But nevertheless it remains absolutely instructive; it does not lend itself to apprenticeship. It is a school, not a workshop; its members are scholars, not apprentices. In it we continue the work begun in the primary school. Even for the workman (ought we not rather to say, before everything else for the workman?) this mental cultivation—by which is formed judgment, affection, will, character, indeed, all those powers which he, more than any one, will need in the struggle for existence—is not a misplaced luxury.

"Our higher primary schools have, therefore, this double object which has been assigned to them from the outset: they unite in the closest association a completing of general education with a beginning of professional instruction."

The Minister of Commerce, in his turn, in a circular issued a week later, defined the aim of the new "practical schools." He recognized the need of a solid basis of general instruction, and stated that this must not be lost sight of. He continued—

"But we must also consider the needs of commerce and industry. Every day, indeed, the commercial struggle between nations becomes more ardent, and the difficulty of trade greater. Industry has undergone a profound transformation; everything is sacrificed to the end to be attained, which is to produce quickly and cheaply; and in consequence of the division of labour and the introduction of machinery, workshop

Higher Primary & " Practical " Schools.

apprenticeship does not exist to-day, except in a few rare instances. Nevertheless, in consequence of the frequent changes which must be effected in plant and tools, the necessity of possessing workmen having adequate theoretical knowledge, and thoroughly trained to the conditions of the workshop, has never been so clearly necessary. We cannot afford to ignore the fact that it is to our interest to fill up a gap existing by the force of circumstances in our commercial and industrial organization, and it has become indispensable to provide our merchants with carefully prepared assistants, and to furnish our factories with high-class workmen. This is the task of the practical school."

How far this aim has been kept in view in the two kinds of schools may best be judged by studying the annexed time-tables.

We thus see that a vast system of higher primary education has been built up which in no way forms part of the so-called educational ladder. It is in itself intended to be complete, and makes no attempt to train its pupils to proceed to the secondary school. There is, indeed, no link between this branch and secondary education, and there is intended to be none. From statistics exhibited in the section of the Ministry of Public Instruction at the last Paris Exhibition, it may be inferred that the system is successful, in that it tends to keep children in the professions or occupations of their parents.

COMPARATIVE TIME-TABLE OF HIGHER PRIMARY AND PRACTICAL SCHOOLS.
NUMBER OF HOURS PER WEEK.

SUBJECTS OF INSTRUCTION.	MINISTRY OF PUBLIC INSTRUCTION: HIGHER PRIMARY SCHOOLS.										MINISTRY OF COMMERCE: PRACTICAL SCHOOLS					
	General Section			Agricultural Section		Commercial Section		Industrial Section.		Of Industry.			Of Commerce.			
	1st Year.	2nd Year	3rd Year	1st Year.	2nd Year.	1st Year.	2nd Year.	1st Year.	2nd Year.	1st Year.	2nd Year.	3rd Year.	1st Year.	2nd Year.	3rd Year.	
Moral Instruction	1	1	1	1	1	1	1	1	1	1	1	1	4½	3	3	
French	5	5	4	2	2	2	2	2	2	3	3	3	3	1½	1½	
Writing	1	1	1	1	1	1	1	1	1	1	1	1	1½	1½	1½	
History and Civic Instruction.	1	1	2	1	1	1	1	1	1	1	1	1	1½	1½	1½	
Geography	1	1	1	1	1	1	1	1	1	1	1	1	1½	1½	1½	
Modern Languages	3	3	2	—	4	4	4	—	—	—	—	—	6	6	6	
Mathematics	4	3	3	2	2	2	2	3	2	3	3	4½	3	4½	6	
Book-keeping	—	1	1	1	3	3	3	2	2	1½	3	3	3	3	3	
Chemistry and Physics	2	2	2	2	2	2	2	2	2	1½	3	1½	—	1½	—	
Natural History and Hygiene.	1	1	1	2	2	2	2	1	1	—	—	—	—	—	—	
Agriculture and Horticulture .	1	1	1	2	2	2	2	—	—	—	—	—	—	—	—	
Elements of Law, Political and Industrial Economy	—	—	1	—	—	—	—	—	—	—	—	1½	—	—	4½	
Drawing and Modelling	3	3	3	1½	1½	1½	1½	1	4½	4½	6	6	1½	1½	1½	
Manual or Agricultural training	4	4	4	6	2	2	2	2	6	30	30	33	—	—	—	
Gymnastics	2	2	2	2	2	2	2	2	2	—	—	—	—	—	—	
Singing	1	1	1	1	1	1	1	1	2½	—	—	—	—	—	—	
Extra hours for Special needs .	—	—	—	3½	4½	3½	—	—	2½	—	—	—	—	—	—	
Total	30	30	30	30	30	30	30	30	30	46½	49½	51	30	31½	33	

Higher Primary & " Practical " Schools.

The comparison between the time-tables of the "general" branch of the French higher primary schools and that of the Prussian Realschule on p. 81 is instructive. And it should be remembered that this "general" branch represents only one part of the organization under the Ministry of Public Instruction. That this Ministry is contending against the specializing tendencies of the Ministry of Commerce is shown by the fact that, by comparing the second and third years of the industrial section of the higher primary schools with the same years of the practical schools of industry, the following result is obtained by the French authorities: In the former, 28 hours a-week are given to theoretical instruction, and 28 to practical; while in the latter only $19\frac{1}{2}$ are given to theoretical, but 77 to practical instruction.

At the close of the higher primary course a certificate is given to those pupils who pass a leaving examination. In 1899, out of 3708 candidates, 1754 were successful in passing this examination. At present this certificate carries no special privileges with it,* and apparently confers but little advantage on the bearer. But probably in time it will obtain admission to certain Government posts, and will be recognized at its proper value by employers.

* For its future use as a means of admission to certain technical schools, see p. 187.

Modern Secondary Education.

Before proceeding to consider the higher branches of the education of those classes for whose benefit the higher primary system has been devised, a few words may be said here as to the development of secondary schools in France. As stated above, an attempt was made in 1865 to create schools of the same nature as the German Realschulen. This attempt may be said to have failed because the pupils of these schools were allowed none of the privileges, chief among which is admission to the universities, granted to those in the higher branches of secondary education. Had it succeeded, there would now be no place for higher primary schools. Looking back on the course of development of the educational system of France during the nineteenth century, the predominant aim of the State appears to have been the checking of the democratic tendencies towards social equality. We shall see later on that in America, during the same period, no such checks have been placed on democratic tendencies, and yet there has been no overcrowding of those special professions and occupations which are considered to bestow a certain social sanction. In France, however, for reasons already stated, such checks appear to have been essential. It is difficult to believe that they are so in England.

The social considerations alluded to have also had their influence on the actual development of

Modern Secondary Education.

secondary education. It will immediately be evident that, where such a course of studies as that in the general section of the higher primary schools has been planned to meet the needs of the lower social orders, there will be great prejudices against a similar course in secondary schools, which are fed by those with higher social aspirations. And, consequently, we find in France almost the same social prejudice against the exclusion of Latin from the secondary schools as we find in England. The annexed table, exhibited in the Educational section of the recent Paris Exhibition, will show plainly the present arrangement of the secondary schools in France. It will be observed that both in France and in England, modern and classical "sides" are to be found in the same schools. But this is by no means necessarily the case; in Paris, for instance, three Lycées and one Collège have no modern side, and one Lycée and one Collège no classical side.

It should be noticed that the French have no leaving examination corresponding to that in the German secondary schools. The examination for the degree of Bachelier in some way replaces this, but it is an examination held at the university, and not in the secondary school. A candidate may present himself as many times as he likes, and may have been prepared by practically any school or any teachers. The different branches of

ELEMENTARY DIVISION.

	Hours.
<i>Seventh Class</i> (average age 10)	
French	9
Modern Languages	4
History	1½
Geography	1½
Science	3
Drawing	1
<i>Eighth Class</i> (average age 8 to 9)	
French	9
Modern Languages	4
History	1½
Geography	1½
Science	3
Drawing	1
<i>Preparatory Class</i> (average age 6 to 8)	
French	9½
Modern Languages	4
History	1½
Geography	1½
Science	2½
Drawing	1

MINISTRY OF PUBLIC INSTRUCTION.

SECONDARY EDUCATION.

DIVISION OF CLASSES.

HIGHER SCIENCE CLASSES.

(Common to both Classical and Modern Teaching.)

Hours.		Courses preparatory to	The Central School of Arts and Manufactures. The Special Military School. The Naval School. The Agricultural Institute.
<i>Class of Special Mathematics</i> , preparatory to the Higher Normal School (science) and to the Ecole Polytechnique	(Mathematics 15 (of which 3 are lectures) Pure and Descriptive Geometry 4 Chemistry and Physics 6 French 1 Modern Languages 2 Drawing 2	These courses are arranged according to the programme for admission to each school.	

CLASSICAL SIDE.
Length of Course of Studies: 7 years.

MODERN SIDE.
Length of Course of Studies: 6 years.

HIGHER DIVISION.

Hours.		Hours.	Hours.
<i>Class of Elementary Mathematics</i> (common to both sides)	(Mathematics 10 Chemistry and Physics 6 Natural History 1 Philosophy 2 History 3 Modern Languages 1	<i>Class of Elementary Mathematics</i> (common to both sides)	(Mathematics 10 Chemistry and Physics 6 Natural History 1 Philosophy 2 History 3 Modern Languages 1
or—	(Philosophy 8 (plus 1 hour during a term of 6 months) History 3 Chemistry and Physics 1 Natural History 2 Mathematics 2 Hygiene (during 3 months) 1 Modern Languages (optional lecture) 1 Drawing (optional) 2	or—	(French 3 Law and Political Economy 1 History 3 History of Art 1 Geography 2 Natural Science 2 Modern Languages (optional) 2 Accounts 1 Drawing (optional) 1
<i>Class of Philosophy</i> (average age 17 to 20)	(French 14 Latin 14 Greek 3 Modern Languages 3 History 2 Geography 1 Mathematics 1 Mathematics (optional lecture) 1 Drawing (optional) 2	<i>Literary</i>	
<i>Class of Rhetoric</i> (average age 16)	(French 14 Latin 14 Greek 3 Modern Languages 3 History 2 Geography 1 Mathematics 1 Mathematics (optional lecture) 1 Drawing (optional) 2	<i>Scientific</i>	(Mathematics 6 Chemistry and Physics 4 Natural History, Hygiene 2 Philosophy 1 Law and Political Economy 1 History 3 Geography 1 Accounts 1 Drawing 3 Modern Languages (optional) 2
<i>Second Class</i> (average age 15)	(French 12 Latin 12 Greek 2 Modern Languages 2 History 2 Geography 1 Mathematics 1 Geology (during 3 months) 1 Drawing (optional) 2	<i>First Class</i> (average age 16 to 17)	(Mathematics 6 Chemistry and Physics 4 Natural History, Hygiene 2 Philosophy 1 Law and Political Economy 1 History 3 Geography 1 Accounts 1 Drawing 3 Modern Languages (optional) 2
<i>Third Class</i> (average age 14)	(French 12 Latin 12 Greek 2 Modern Languages 2 History 2 Geography 1 Mathematics 1 Mathematics (optional lecture) 1 Drawing (optional) 2	<i>Second Class</i> (average age 15 to 16)	(French 5 Modern Languages 6 History 2 Geography 2 Mathematics 4 Chemistry and Physics 4 Drawing 3

"GRAMMAR" DIVISION.

Hours.		Hours.	Hours.
<i>Fourth Class</i> (average age 13)	(French 13 Latin 13 Greek 2 Modern Languages 2 History 2 Geography 1 Geometry 2 Drawing 1	<i>Fourth Class</i> (average age 13 to 14)	(French 5 Modern Languages 8 History 2 Practical Morals 1 Geography 1 Mathematics 3 Drawing 3
<i>Fifth Class</i> (average age 12)	(French 13 Latin 13 Greek (from 1st January) 3 Modern Languages 3 History and Geography 2 Geology and Botany 1 Arithmetic 1 Drawing 1	<i>Fifth Class</i> (average age 12 to 13)	(French 6 Modern Languages 8 History 2 Geography 1 Arithmetic 1 Geology and Botany 1 Drawing 3
<i>Sixth Class</i> (average age 11)	(French 13 Latin 13 Modern Languages 3 History and Geography 2 Zoology 1 Arithmetic 1 Drawing 1	<i>Sixth Class</i> (average age 11 to 12)	(French 6 German 3 History and Geography 2 Arithmetic 2 Zoology 2 Writing 2 Drawing 3

ELEMENTARY DIVISION.

Hours.		Hours.	Hours.
<i>Seventh Class</i> (average age 10)	(French 9 Modern Languages 4 History 1 Geography 1 Science 3 Drawing 1	<i>Seventh Class</i> (average age 10)	(French 9 Modern Languages 4 History 1 Geography 1 Science 3 Drawing 1
<i>Eighth Class</i> (average age 8 to 9)	(French 9 Modern Languages 4 History 1 Geography 1 Science 3 Drawing 1	<i>Eighth Class</i> (average age 8 to 9)	(French 9 Modern Languages 4 History 1 Geography 1 Science 3 Drawing 1
<i>Preparatory Classes</i> (average age 6 to 8)	(French 9 Modern Languages 4 History 1 Geography 1 Science 3 Drawing 1	<i>Preparatory Classes</i> (average age 6 to 8)	(French 9 Modern Languages 4 History 1 Geography 1 Science 3 Drawing 1

The Baccalauréat.

this examination have, in short, come to be regarded as bestowing a degree carrying with it admission to various professions and further courses of study, rather than as affording a test of having passed satisfactorily through a certain course of secondary education.

Since 1890 this examination has been divided into two distinct sections. The first, called the classical *baccalauréat*, has been subdivided into the two sections: (1) literary-philosophical, and (2) literary-mathematical; the second, the modern *baccalauréat*, into three sections: (1) literary-philosophical, (2) literary-scientific, and (3) literary-mathematical. These two sections correspond respectively to the two sides in the foregoing time-table. It will be seen, therefore, that the candidates for the modern *baccalauréat* are younger than those for the classical. It is not surprising that the former should carry with it fewer privileges than the latter. The relative popularity of the classical side is shown by the fact that three times as many candidates present themselves for the classical as for the modern *baccalauréat*. There is at present a very strong movement in favour of raising the modern side to the same level as that of the classical, and reintroducing the old *baccalauréat-ès-sciences*, which is, of course, not satisfactorily replaced by the second section of the higher division in the present arrangement.

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Écoles Nationales Professionnelles.

When reviewing the technical tendencies of the higher primary schools, it was seen that there is a tendency on the part of the Ministry of Public Instruction to insist, as far as possible, on general education in all schools under its control. The Ministry of Commerce, on the other hand, stands for the utilitarian rather than for the educational idea, and, consequently, it has gradually drawn beneath its sway all those schools in which the special technical aim predominates. We do not find in France any clearly defined system of schools, as in Germany ; indeed, the French system presents a good deal of confusion, and the struggle in the higher primary sphere between the two Ministries, representing more or less antagonistic ideas, produces of necessity a certain amount of overlapping of effort. At times, indeed, it appears that there must on this account be a good deal of unnecessary expenditure. In the case of the *Écoles Nationales Professionnelles*, for instance, it is difficult to see how the Ministry of Public Instruction has had in practice anything more than a purely utilitarian and technical aim. Speaking in 1898, however, M. Buisson, to whom French primary education and that of all other countries lies under a heavy debt, thus drew a distinction—

“They are in no way special technical schools . . . they offer a complete scholastic system (*des groupes scolaires*), comprising the infants’ school,

Écoles Nationales Professionnelles.

the elementary school, and the higher primary school; and in all grades there is professional education, increasing by regular gradations from the first years, in which it is practically non-existent, until the last half-year, when it is everything. Having arrived at this stage, the apprentice, who now only requires the practice of his trade to become a workman, leaves the *école nationale* either to enter the workshop or to proceed to a real technical school. These schools, therefore, are establishments offering a preparation for general life, as well as for the special life of the workman."

However this may be, it is difficult for any one who is accustomed to the educational ideas of different countries to regard these schools as other than technical. It is true that they pay attention to general instruction, judging from their timetables, but every one who saw their very fine exhibit at the recent Paris Exhibition was struck chiefly with the great technical skill displayed by their pupils. At that moment they were, in fact, considered ripe for the Ministry of Commerce and Industry, though the Ministry of Public Instruction regarded them as the crown of the two hundred higher primary schools for boys. The most striking objects among their exhibits were an agricultural locomotive, a petroleum motor working a dynamo, gates of forged iron, a steam-engine, and various pieces of furniture. Where boys are taught mainly to make such things as these, the school may fairly

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be considered technical. Indeed, one cannot refrain from thinking that a great many of the fine distinctions which are drawn between technical and general education are due to the anxiety of the Ministry of Public Instruction to maintain its claim to the schools which it has in the past controlled with such marked success. There are now four of these schools: Vierzon, founded in 1881; Armentières and Voiron, in 1882; and Nantes, in 1898. 3,193 pupils passed through these schools between the years 1889 and 1899.

Of the other technical schools in the higher primary sphere we may notice here the Practical Schools of Commerce and Industry referred to in the foregoing pages. It has been seen how these schools were placed under the sole control of the Ministry of Commerce.* Being primary, they come under the law making all primary instruction free, and therefore they charge no fees. There are now thirty-three (thirty-one actually at work in 1900) of these schools in different parts of France, founded or transformed since 1892. In the budget of 1889, 1,174,909 francs were voted for the encouragement of industrial and commercial education, including the support of these schools. Of the thirty-one at work in 1900, thirteen give industrial education only, two commercial instruction only, and sixteen both kinds of instruction.

* Cf. p. 162, *et seq.*, and also Comparative Time-table on p. 167.

and Industry.

In 1898 there were 4000 boys and girls attending the twenty-seven schools of this kind then open.

No boy or girl is admitted to these schools under the age of twelve. If the candidate for admission be under thirteen years of age, the leaving certificate of the primary school must be produced. If more than thirteen, the candidate who is not in possession of this certificate must undergo an examination. In any case a competitive examination may be held for admission where the number of candidates is greater than the number of places vacant. Provision may be made for boarders, with the special permission of the Minister. This is sometimes desirable where the schools have to serve a large district. A number of scholarships are given by the Ministry, by the departments, and by the communes, both for boarding and maintenance. These scholarships are awarded by preference to the children of poor parents, who intend to follow the normal courses—that is to say, the courses which prepare directly for a profession and not for higher technical schools. The scholarships are generally, but not invariably, awarded on the results of a competitive examination, held once a year.

At the close of the full course, in both the industrial and commercial schools, an examination is held for a leaving certificate. To obtain these certificates the candidate must gain not less than

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an average of twelve marks out of twenty, and in no single subject less than five.

The masters and mistresses in these schools must hold certificates of aptitude as head or assistant teacher, as the case may be. These certificates are awarded on the results of a very searching examination, regulated by the ministerial decree. As usual, these examinations are both oral and written. It is interesting to notice that, in the case of the teachers in the commercial schools, a number of the successful candidates at the certificate examination are awarded scholarships to enable them to study in England, Spain, or Germany, according to the special language in which they have proved themselves proficient in the examination. They must leave France within a month of the close of the examination, and reside for ten full months in the town which has been selected for them. The holders of such scholarships must sign an engagement to serve for six years in a Practical School of Commerce or Industry. Every two months they must send to the proper authorities a report of their doings in the foreign country, written in the language they are studying. On their return from abroad they must pass a further examination. One part of this examination consists in giving a lesson on a selected commercial subject in the foreign language, the candidate being allowed four hours to prepare

and Industry.

the lesson. The other parts of the examination consist of an interrogation on political economy and the history of commerce.

Too much stress cannot be laid on the fact that both in France and Germany it is considered that the first essential to efficient schools of every kind are properly qualified teachers, and that money and thought is therefore devoted to their training.

The nature of the Practical Schools of Commerce and Industry may best be understood from a short account of one of them. Not the least well known is the Practical School of Industry at Saint-Étienne.

In 1879 the municipal council of Saint-Étienne passed a resolution in favour of establishing a technical high school. But, though similar resolutions were adopted on several subsequent occasions, they led to no practical result. In 1882, however, the council demanded merely an *école professionnelle*, and, at the same sitting in which the resolution was adopted, voted 130,000 francs for the creation of such a school in a large house owned by the municipality. A few months later this plan was approved by the superior authorities, and the school was opened, at the end of the same year, with fifty-four pupils. It was soon found necessary to provide more commodious quarters, and in 1884 the municipality began to construct a suitable building on a large piece of land

Practical School of Industry for Boys.

possessed by the town. In eighteen months the school was at work in its new quarters.

When the buildings were opened, the equipment was far from complete, and the pupils themselves were set to work to supply what was still wanting. For several years, during the first of which they were aided by a professional workman, they were employed in making the necessary machines, tools, models, and various apparatus. The work which they thus performed has been estimated at the value of 35,000 francs.

On its creation the school received the title of higher primary and "professional" school, and was exclusively under the control of the Minister of Public Instruction; but later it was placed under the dual control of this Minister and the Minister of Commerce. Since 1892, however, the latter Minister has been solely responsible for this school, which since that date has borne its present title.

The school consists of two buildings. In the first is carried on the general instruction, and consists of—five class-rooms, each built for sixty pupils; five lecture-rooms; one chemical amphitheatre with 150 places; a chemical laboratory; a physical amphitheatre; a laboratory for industrial electricity; a large art-room, with a store-room for models; a library; a museum, etc.

In the second buildings are the engine (35 H.P.)

Practical School of Industry for Boys.

and a dynamo, which supplies 270 lamps (20-candle power), one arc lamp, and the electrical laboratory. The rest of the building consists of the different workshops, covering altogether 1400 square metres. These workshops are eight in number: namely, two mechanical workshops, a smiths' shop, a workshop for armoury and industrial electricity, a joiners' and pattern shop, a weaving shed, a dyeing and bleaching shed, and a sculpture and modelling room.

So far, 673,000 francs have been spent on this school, divided thus:—

Building and equipment	455,000 francs.
Plant	160,000 „
Teaching material	58,000 „
	<hr/>
Total	673,000 „

The yearly budget of the school shows an expenditure of 106,777 francs, of which 43,790 are provided by the State, and 62,987 by the town. The Chamber of Commerce gives 300 francs yearly for prizes; two other prizes of 100 francs have been given, and a sum of 40,000 francs was bequeathed for the same purpose.

The length of the course at the Saint-Étienne school is four years. The first year is called the preparatory year. During this year the elementary education of the pupils is completed, and they pass through all the different workshops in order

Practical School of Industry for Boys.

that their special aptitudes and tastes may be determined. The number of hours per week generally devoted to each subject in all schools of this sort are shown by the official time-tables. In this school, however, the hours are reduced—a reduction which is justified by the existence of the preparatory year in addition to the courses decreed by the official regulations, and which is necessitated by the fact that the families of many of the pupils live so far away that it is impossible for them to come to school before 7.30 a.m. or to remain after 6.30 p.m.

The following note in the official account of this school, from which the above information has been derived, is instructive, as showing the fear ever present in the minds of the French educational authorities of encouraging ambitions which pupils may not in after life be able to satisfy. It states that, Saint-Étienne, like other schools of the same type, prepares candidates for higher technical schools.

“But,” it adds, “it is all important to avoid making *déclassés*; therefore these candidates do not, properly speaking, form a special section. Indeed, they follow the same courses as the other pupils. . . . It is only during the year which precedes their examinations, and during a part of the time which is devoted to work in the shops, that they receive private instruction in the subjects

Practical School of Industry for Boys.

of the examinations for admission to the higher schools. Thus, in case of failure, they are not stranded (*dévoysés*); they can, like their fellow-pupils, enter a workshop or factory. Moreover, pupils are admitted to this special instruction only at their own request, and if they are found to possess the necessary ability."

In the years 1894 to 1899 there were 116 such candidates who presented themselves at the examinations for admission to the technical schools of a higher grade. Out of these seventy-two proved successful. During the same period four pupils on leaving the school entered a *lycée*, two of whom proceeded thence to higher technical schools.

In 1900 there were more than four hundred boys in this school. At first it attracted only the children of the working-classes, and some who had proved unsuccessful in other kinds of schools; but now foremen, managers, employers, and persons still higher in the industrial scale, send their children to be taught there. Thirty-two of the pupils hold scholarships. Of the scholarships awarded on examination, one pupil holds one of 500 francs, nine hold scholarships of 250 francs, and twelve scholarships of 125 francs. Five pupils also hold scholarships of 250 francs and five of 125 francs, which were awarded without competitive examination. All these scholarships were granted by the State, neither the

A Practical School of Commerce

department nor the town giving any assistance in this way. There is no boarding establishment connected with the institution.

Perhaps the best test which can be applied to the practical benefits to be derived from such a school is that of the wages its pupils receive in later life compared with those of men who receive no such education. An inquiry was made in this connection with regard to 730 pupils. Of these, those who had left the school in the middle or at the end of the third year were earning 4.50 francs at the age of twenty; those who had left it at the middle or at the end of the fourth year were earning 5.20 francs at the same age. The school authorities remark that this is better than the 1 franc a day earned by young men who have had no such education.

In the same town there is a Practical School of Commerce and Industry for girls, but a brief account of a similar school at Havre may prove more interesting. The early history of this school was much the same as that of the boys at Saint-Étienne. It is now located in a building specially constructed for the purpose in 1880. It contains five class-rooms, one music-room, one art-room, three cutting-out rooms, one ironing-room, one kitchen, one trying-on room. The sewing and ironing rooms contain the following equipment:—

Four sewing - machines; twenty - one dress-

and Industry for Girls.

makers' models of different sizes ; irons for pressing seams ; embroidery frames of different sorts. A separate building contains : the ironing-room (with irons for polishing, goffering, etc.) ; the laundry, with various washing and drying machines.

The town of Havre undertook all the expenses of construction, amounting to about 198,000 francs, together with 18,000 francs for later improvements. The school costs the town about 29,000 francs a year, but against this must be set 4500 francs produced by the work of the pupils. The only other resources are about 4000 francs from the State, and 100 francs from the department in which the town is situated. In 1899 there were 105 girls in the commercial and 156 in the industrial section. The following statistics are interesting. In 1897 sixty-five pupils were being instructed in dressmaking, fifty-five in the making of underlinen, twelve in ironing, eight in millinery, and fifteen in art needlework. In the School of Commerce there were eighty pupils. Five of these, on leaving the school, entered a training-college for primary teachers, and four went into business. Twenty-eight pupils took up industrial occupations, or went back to their families to exercise different professions ; four went to England, and eighty-five obtained various certificates. It is found that about one-third of

Écoles Nationales d'Arts et Métiers.

the pupils in the industrial section return to their families on leaving the school, and do not take up independent employment.

In connection with this school the Friendly Association of past and present pupils should be noticed. This association, which meets as often as possible in the school, consists of 166 present pupils and 105 past pupils and their friends. Such associations have proved a great success in connection with many French schools. They possess numerous advantages, and are particularly useful in helping pupils to find situations on leaving the school.

Above the Practical Schools of Commerce and Industry—but not in any way complementary to them, in the sense that the lower prepare pupils for the higher—come the *Écoles Nationales d'Arts et Métiers*. In 1788 the Duke of La Rochefoucault-Liancourt founded a school, in one of his farms near Liancourt, for the sons of the non-commissioned officers of his regiment of cavalry. His idea was that these children should learn a trade while undergoing the ordinary course of general instruction. In 1799 the Government of the Republic declared this school national, and transferred it to Compiègne. When Napoleon was first Consul he visited this school. As a result of his observation of the ignorance of French workmen, he remarked—

Écoles Nationales d'Arts et Métiers.

"Everywhere I have found foremen distinguished in their art, and displaying remarkable skill in execution, but hardly one who was able to make a sketch or the simplest mechanical calculation, or who was able to express his ideas by a drawing or in writing. There is thus a want in French industry which I mean to supply here. We will have no more Latin (that will be taught in the *lycées* which are going to be organized), but trades must be taught with the theory necessary for their promotion. Here shall be formed excellent foremen for our factories "

As a result the school of Compiègne was re-organized in 1803; and in 1806, owing to the increase in the number of its pupils, it was removed to more commodious premises in Chalon-sur-Marne. In 1803 a similar school was opened in Beaupréau, which was transferred, in 1815, to Angers. In 1843, a third of these schools was started in Aix, and a fourth has recently been established in Lille.

There is no more interesting chapter in the history of French technical education than that which relates the development of these schools. At the outset, in the school of Compiègne, pupils were admitted at the age of eight, and until twelve they were taught reading, writing, the elements of French grammar, arithmetic (the four rules and fractions), and the elements of geometry and drawing. Then followed descriptive and machine drawing, and, for the brighter pupils, mechanics.

Écoles Nationales d'Arts et Métiers.

There were five different kinds of workshops in the school. There appears to have been no fixed length to the course of studies, some of the boys remaining even ten years. Without tracing these schools through all the political changes which affected them, we need only notice that in 1832 the upper and lower limits of age were placed at fifteen and seventeen respectively. At the same time it was decreed that a competitive examination should be held for admission. From 1885 onwards the course of studies in these schools was gradually widened and raised to a higher level. But in spite of the very high standard which they had attained, it was again repeated, in a decree of 1899, that the object of these schools was "to train workmen capable of becoming the heads of workshops, and manufacturers versed in the practice of the mechanical arts." Once more in the official account of these schools we find the same insistence on the practical aim of the education they should afford, and evidence of the same desire to discourage ambition which may lead the pupils into paths which are already overcrowded. Having pointed out that the distinguishing feature of these schools is manual instruction in the workshop, to which not less than six hours a day is devoted, this account proceeds as follows:—"Thanks to such a training, followed for three years, there is not a certificated pupil of the *Écoles Nationales*,

Écoles Nationales d'Arts et Métiers.

whether he be a fitter, pattern-maker, founder, or smith, who cannot boldly take his place in a workshop, and, after a short time, honourably gain his living there."

It is then stated that all the "best inspired" of the pupils follow such a course on leaving the schools, and that this tendency is strongly encouraged by the authorities. Hopes are held out that in this way the instruction which the pupils have received will enable them to pass rapidly through all the grades of the army of work, and justifies them in aspiring to the highest situations in the industrial world.

As might be expected, these schools are under the control of the Minister of Commerce. Their teachers are all carefully selected, professional preparation being insisted on as in the case of other schools in France. At one time day pupils were admitted, now they take boarders only. No candidate is admitted to the competitive examination for admission unless he is of French nationality, and not less than fifteen or more than seventeen years old. It is significant that, after 1903, no one will be admitted who does not hold the leaving certificate of a higher primary school, or of a practical school of industry. As a compensation for these increased demands, the upper limit of age will be raised by nine months. The object of this new regulation is to ensure a higher attainment of

Écoles Nationales d'Arts et Métiers.

general culture among the candidates for admission, it having been found here, as generally elsewhere, that where examination is alone employed as a test it often fails in its object, and encourages "cramming" at the expense of proper education. It may be inferred from this new regulation, that it is not desired that the pupils in these schools should have passed through any stage of secondary education. This is not surprising when it is remembered that the tendency in France is, as has already been stated, to discourage the children of the lower commercial and industrial classes from attending the secondary school.

The popularity of the *Écoles Nationales d'Arts et Métiers* may be judged from the fact, that, in 1899, no less than 1348 candidates presented themselves at the competitive examination for 300 vacant places. The time-table on pp. 190, 191 will show the nature of the work in these schools.

It will be seen that Table A represents only the theoretical side of the instruction. Classes of industrial hygiene, and moral and civic instruction, have recently been added.

The practical instruction is carried on in four workshops, viz. the fitting-shop, the smithy, etc., the pattern-shop, and the foundry. On entering the school the pupils are divided among these different workshops. It is found that, taking into account the needs and the preferences of the boys

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themselves, out of one hundred new pupils, seventy enter the fitting-shop, and the rest are divided equally among the others. At the end of the third year, each lad is required to spend a certain time in that workshop which is most closely connected with the one in which he has been receiving instruction ; for instance, the fitters pass into the smithy, and the pattern-makers to the foundry. Six hours a day is devoted to manual instruction. The British Technical Instruction Commissioners, in their Report of 1884, gave the following account of the work they found going on in the Chalons school :—

“ In the fitting-shop, which is divided into three sections, one of which corresponds with each year of training, there is a large stock of plant, an engine and boiler, which the other students manage in turn for a week each, as stoker and driver, and a tool-store from which the necessary tools are issued ; the students make squares, compasses, vices, etc. In the second year, they pass on to detached portions of machinery, and make small simple machines. In the third year, they are employed in the production of machines either for actual use in the school, or for sale outside. The school, in undertaking contracts for work, will not bind itself to deliver at a given date, and therefore does not compete with any manufacturing establishment.

“ The foundry contains three cupolas, one of which serves for heavy castings ; among the objects cast, are headstocks, and beds for lathes, and frames for spinning-machines. At the time of

ÉCOLES NATIONALES

A.—ARRANGEMENT OF

FIRST YEAR.				SECOND	
First Half-year.		Second Half-year.		First Half-year.	
Subject	Number of lessons.	Subject.	Number of lessons.	Subject.	Number of lessons.
Algebra.	25	Geometry	6	Descriptive geometry	7
Geometry .	24	Descriptive geometry .	17	Kinematics .	28
Descriptive geometry .	16	Higher mathematics	10	Physics .	18
Literature .	16	Cosmography, surveying, and levelling	14	Chemistry .	18
Technology .	16	Trigonometry	20	Literature .	10
		Literature .	16	Geography .	8
		Technology .	17	Technology .	17
Total .	97	Total .	100	Total .	106
Total for first year . 197 lessons.				Total for second	

General Total for the

B.—DIVISION

Every Week-day.—5.30, Rise. 5.50, Recreation. 6, Preparation. 9.30, Workshop. 12, Dinner. 12.20, Recreation. 1.30, Drawing. Preparation. 8.45, Recreation. 9, Bedtime.

Sunday.—6.30, Rise. 6.50, Recreation. 7 to 8, Preparation 9.30 to 12, Recreation. 12, Dinner. 1 to 5, Walk. 5 to 5.45. 8, Bedtime in winter ; 9, Bedtime in summer.

D'ARTS ET MÉTIERS.

CLASSES FOR THE YEAR.

YEAR.		THIRD YEAR.			
Second Half-year		First Half-year.		Second Half-year.	
Subject	Number of lessons	Subject	Number of lessons.	Subject	Number of lessons.
Kinematics .	33	Mechanics .	54	Mechanics .	49
Physics .	17	Electricity .	18	Electricity .	4
Chemistry .	16	Literature .	7	Metallurgy .	12
Literature .	9	History .	10	French .	7
Geography .	8	Industrial		History .	10
Technology .	17	book - keep-		Industrial	
		ing, indus-		book - keep-	
		trial economy		ing, indus-	
		and geo-		trial economy	
		graphy	12	and geo-	
		Elements of		graphy .	11
		industrial and		Elements of	
		commercial		industrial and	
		law .	5	commercial	
				law .	5
Total .	100	Total .	106	Total .	98
year : 206 lessons.		Total for third year : 204 lessons.			

three years : 607 lessons.

OF TIME.

paration. 7.30, Breakfast. 7.45, Recreation. 8 to 9.30, Class. 3.15, Workshop. 7, Supper. 7.20, Recreation. 7.30 to 8.45,

(drawing). 8, Breakfast. 9, Preparation or devotional exercises. Recreation. 5.45 to 7, Preparation. 7, Supper. 7.30, Recreation,

Écoles Nationales d'Arts et Métiers.

our visit they were at work on a casting weighing 30 cwt.

"The smithy has eight forges. Two students work at each, and take it in turns to act as smith and striker. Among the articles made are vices, screw presses, copying presses, etc.

"The pattern-shop has places made for one hundred students: it is well provided with tools, and admirably arranged. Patterns are made for lathe-headstocks, beds for lathes and planing machines, driving-pullies, etc."

At the end of each year an examination is held for admission to the succeeding year's course. This admission is not granted to any pupil who has not obtained at least eleven-twentieths of the total number of marks, and not less than six-twentieths in any particular subject. The marks awarded in these intermediate examinations go to decide the position occupied by the pupils on leaving the school. Those who pass the leaving examination obtain the title of "certificated pupil of the *Écoles Nationales d'Arts et Métiers*." The pupil who comes out first at the end of the course receives a gold medal. Those whose general average of marks is not less than fifteen out of twenty, and in no particular subject less than eleven out of twenty, receive silver medals. The first fifteen pupils, who, due allowance being made for their military service, within two years after leaving the school, spend a year in an industrial workshop, receive a prize of

Écoles Nationales d'Arts et Métiers.

£50. The total fees, including boarding, are about £38 a year. There are, however, numerous scholarships. The number of pupils per school does not exceed three hundred. The total expenses of the three schools of Aix, Angers, and Chalons amount to more than £52,000 a year.

In relation to what has been said of the checks to social ambitions provided by such schools as those under consideration, it may be noted that a certain number of pupils proceed hence to the *École Centrale des Arts et Manufactures*.* They thus avoid the secondary school altogether. As a result, it is found that they experience considerable difficulty at the outset with the theoretical work in the *École Centrale*. Being picked pupils, they surmount this difficulty in a short time. The discipline in these schools is marked by the same rigour, and there is the same absence of sports and physical amusements as is to be found in most French boarding-schools. The custom of wearing school uniforms is also maintained.

Those who search in France for a well-organized and clearly defined system of schools under State control will experience difficulty in discovering the exact place filled in such a system by some of the technical schools. Those, for instance, of the type of the National Practical School for workmen and foremen at Cluny

* See p. 196.

The School at Cluny.

would seem at first sight to be unnecessary. It is, at any rate, instructive—as again showing the pains taken by the French nation to check overweening ambition—to read the explanation of the need of this school offered by the Minister of Commerce to the French Parliament in 1891. He stated that the *Écoles Nationales d'Arts et Métiers* had so extended their programme, in response to the increased demands of industry, that they could no longer claim merely to train the non-commissioned officers of the industrial army. There was still, however, a need to train foremen, in the strictest sense of the word. A series of institutions was therefore necessary which would fill the place formerly occupied by the *Écoles d'Arts et Métiers*. Further, he said that these schools had created a new class of *dévoyés and déclassés*. They refused admission every year to a number of boys who had passed the entrance examination, but for whom they were unable to find room. And, moreover, a number of those who were admitted were found, after beginning their studies, to be unable to continue them beyond a certain point, owing to the weakness of their former education. Such weakness cannot always be detected by examination. The Minister calculated that this class numbered about three hundred every year.

The chief differences between the Cluny school and the *Écoles d'Arts et Métiers* are, first, the lower

Technical High Schools.

fees, which here are about £34 a year ; secondly, the lower standard of knowledge demanded at the entrance examination ; and thirdly, the greater number of hours given to manual training in the course of instruction. It is impossible, before turning to the higher technical schools in France, to do more than mention the two National Schools of Watch and Clockmaking at Cluses and Besançon.

In France, as in Germany, there are technical High Schools of university rank. Such institutions may be said to be distinguished from the universities only in that they provide a special education, based on a general secondary education, either modern or classical, for industrial and commercial occupations, while the latter provide a special education, based on classical secondary education, for the learned professions. Such schools are far removed from the necessity of placing any checks on ambition ; the men and women for whom they provide education have already proved themselves capable of entering upon any career which is open to the highest merit. It is these schools for which the need has not yet been fully recognized in England. Starting from the bottom, we seem at last to be nearing that stage in the development of our educational system where an attempt may be made to raise such schools on the foundations already laid. In France and Germany, on the other hand, as soon as the need for

École Centrale.

such schools was recognized they were created, and the schools of a lower grade were remodelled, if it was necessary, so as to supply the higher institutions with properly prepared pupils. But the people of these two countries perceived that a sound general secondary education—rather than preliminary instruction in any special branches of knowledge—was the only reliable basis for all education of university grade; and it was for this reason that they were able to carry on these schools successfully, at a time when we were trying to supply their place by educational “short cuts,” dear to the practical, or rather utilitarian, minds of the last generation and its predecessor in England. These technical High Schools may be divided into two distinct classes: industrial and commercial. The oldest are the industrial High Schools.

The *École Centrale des Arts et Manufactures* is as well known to any Frenchman as the most famous of his universities. It was founded through private initiative in 1829. One of the chief reasons advanced for establishing such an institution was the need of training a body of engineers (in the more restricted and higher French sense of the term) who could rival those to be found in England. Having survived the political tumult of the next quarter of a century, the school had attained such a height of success in 1857 that its pupils numbered 475, and it made a nett annual profit of £3560.

École Centrale.

At this period the fees were £32 a year. The director of the school, who had supplied the funds necessary for its establishment, now presented it as it stood to the State. He refused the offer of a million francs from former pupils for the purpose of placing it under the control of a private company. The only return he demanded from the State, besides pensions for his collaborators, was the promise that the profits should in the future be devoted to the interests of the school.

The need had now become imperative for more suitable buildings than those in which it was located, and in 1884 it was removed to the magnificent quarters which it now occupies. From the profits accruing since 1857 the school itself was able to contribute no less than £71,680 to the cost of the new building; the town of Paris contributed £40,800 in the form of a reduction on the price of the land which it sold to the State. The total cost of the new establishment was about £431,554. Owing to the great expense thus incurred it was considered advisable to raise the fees to £36 for the first year's course, and £40 for that of each of the two succeeding years. From this time onwards the school has continued to prosper, and the number of pupils has slightly increased.

One of the first actions of the State after taking over the *École Centrale* was to establish a competitive entrance examination. Hitherto the

École Centrale.

secondary schools had generally decided which of the pupils leaving them were worthy of admission to the *École Centrale*. The new regulations now obliged many of the secondary schools to create special classes, resembling in some respects the army classes in our public schools, to prepare for this entrance examination.* The change is said to have resulted in raising the standard of attainments. Each year about 240 pupils were admitted. Both Frenchmen and foreigners are admitted, but since 1870 the number of foreigners attending the school has been reduced to a negligible quantity.

The difficulty presented by the exigencies of military service for the great majority of the young men attending the *École Centrale* is surmounted in the following manner. On entering the school they enlist for four years, and during the three years, in which they pursue their studies, they receive, in the school, military instruction according to official regulations. On leaving the school they have, therefore, only one year to serve, and having received special preparation for an officer's examination, they generally serve this year as second-lieutenants in the reserve, generally in an artillery regiment.

None of the students in the *École Centrale* are boarders, but they spend the entire day in the

* Cf. Table facing p. 170.

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school. Work begins at 8.30 a.m. During the morning there are two classes of an hour and a half each. At noon lunch is taken in a restaurant on the premises. From 1 p.m. to 4 p.m. there is laboratory work, drawing, etc. From 4 p.m. to 6 p.m., on most days, military drill, or classes on military art are held.

The fundamental principle of all the teaching is that enunciated by the founders of the school, in the saying: "The science of industry is one and indivisible; every manufacturer or leader of industry must know it in its entirety or remain unequal to his task." Accordingly all the students follow the same course of studies. Towards the end of the second year, it is true, they are divided into four classes, according as they intend to specialize in mechanics, engineering, mining and metallurgy, or chemistry. But even then specialization is reduced to a minimum, all the students still following all the classes while studying the special application of science to their own particular branch. It is considered in France that, owing to thus emphasizing the need of a general knowledge of the different branches of industry, the school has been successful in preparing students who have distinguished themselves in every department of industrial activity.

At the end of the third year, after having passed through the whole course, the student enters for

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the diploma. To obtain this he has to compose a thesis or "*project*" on the special one of the four branches which he has selected. In 1884, the British Technical Instruction Commissioners stated in their report that they "inspected several of the theses of the outgoing students of former years, in each of the (above) departments, and were much struck with the detailed character of the work, and especially with the completeness of the drawings. The students are allowed to work at home, but have to produce the calculations, descriptions, and drawings, within one month from the time at which the subject is given out, and the whole work is carefully examined by a council of professors, the student being examined on the details of his theses."

The Commissioners, however, submitted another of these theses to a well-known English manufacturer, who considered that, among other defects, it showed a want of knowledge of the practical conditions of manufacture. Such a knowledge the student is, of course, intended to acquire when he actually enters industrial life. And the success in life of the pupils in the *École Centrale* proves that they lose nothing by continuing their theoretical education beyond the age at which we believe that facts and practical conditions can alone supply useful training.

As showing how the peculiar conditions of its national life will influence each people in the details

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and organization of its education, the following anecdote is interesting. When I was visiting the *École Centrale*, last year, the eminent director of the school explained to me the different reasons for insisting on general education in the sense explained above. Among other practical benefits to be derived from not specializing, he pointed to one which would certainly be overlooked by Englishmen. He said that it not infrequently happened that a student who entered life as an engineer, for instance, married the daughter of a manufacturer in one of the other three divisions of industry. But, having been trained in all four, the fortunate student had no difficulty in transferring his abilities to that branch of industry favoured by his father-in-law—which he would be probably expected to do. Apparently the director thought that I showed signs of incredulity as to this application of the principle of *mariages de convenance*; for, on meeting me in public one evening shortly after, he introduced me to a former student of the school, who related how he was just about to contract such a marriage. It was entirely due, he said, to his having passed through the general course of the *École Centrale* that he was able to satisfy an essential condition of the bargain and renounce engineering in favour of chemical industry, in which branch his prospective father-in-law had built up a very successful business.

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The following tables in connection with the
École Centrale give interesting details :—

I.

Total number of pupils who have passed through the school (including those who left in 1899)	7950
Former pupils actually alive	5830
Former pupils { Living in France	5044
Abroad (at the end of 1898)	593
In Alsace-Lorraine (at the end of 1898)	70
In Algiers and the French colonies	123

II.

A STUDENT'S WORK.

Years.	<i>Travaux gr- piques</i> Number of hours	<i>Projets Travaux pratiques</i> Number of hours	Classes.		Examinations	
			Number of lessons (1½ hours each)	Number of hours	Special. Number of exami- nations	General Number of exami- nations
1st Year	432	99	397	596	22	10
2nd Year	66	434	390	585	23	10
3rd Year	—	467	318	477	20	7
Total for 3 years	498	1,000	1,105	1,658	65	27

Before proceeding to consider the commercial schools of university rank, a few words may be said about an institution which can hardly be called a technical high school, but which has nevertheless exercised a very great influence on the development of trade and industry in France.

Conservatoire des Arts et Métiers.

The idea which is embodied in the *Conservatoire National des Arts et Métiers* was originally put forward by Descartes (1596-1650). He proposed to build in certain public institutions various large halls for artisans, each of which should be devoted to the different trades. "In each of these halls there should be collections of the mechanical appliances necessary or useful for the arts to be taught there. Sufficient funds should be provided, not only for the cost of experiments, but also for supporting masters or professors, whose number should be equal to that of the arts to be taught. These professors should be proficient in mathematics and in physics, so as to be able to answer all the questions put to them by artisans, and to explain the reason of everything, and throw light on the new discoveries to be made in the arts."

Such a project has now been realized. In 1775, Vaucanson brought together, at his own expense, a public collection of machines, instruments, and tools for the instruction of the working-classes. This has now developed into the famous *Conservatoire*. In 1819, Louis XVIII. decreed that there should be established in this institution free public instruction in the application of the arts and sciences to industry. For this purpose there were to be three courses of lectures, namely, lectures on Mechanics and Chemistry as applied to industry, and on Industrial Economy. In 1899,

Conservatoire National des

lectures were given at the *Conservatoire* on the following subjects: Descriptive Geometry, Applied Mechanics, Civil Engineering, Applied Physics, Industrial Electricity, Industrial Chemistry, Metallurgy, Chemistry applied to the dyeing, ceramic and glass industries, Agricultural and Analytical Chemistry, Agriculture, Industrial Art, Spinning and Weaving, Political Economy and Industrial Law, Industrial Economy, Commercial Law and Social Economy. This list does not, however, represent permanent courses of lectures forming a complete curriculum. Some of them, it is true, must, from their very nature, be permanent; others are created in order to give some illustrious savant an opportunity of making known his discoveries to the public, and are thus a means of bringing into touch with one another, to their mutual benefit, the genius of scientific research and the practical spirit of industry.

It also happens occasionally that the practical needs of industry may afford a reason for suppressing one course in favour of another. For instance, this happened in the case of the lectures on agricultural engineering. The Council of Improvements, which regulate such matters for the Conservatoire, resolved that this course should be replaced by one on industrial art. This new course, which was started in 1889, has met with the greatest success. The needs of such

Arts et Métiers.

a course are explained by M. Liebaut, of the Conservatoire, in a passage which may well be introduced here. He says—

“It is on art that modern industry depends for increasing the worth and standard of its productions. It is on art also that the artisan depends for the means of exercising, with taste as well as intelligence, the craft by which he earns his living. There is thus throughout the whole world an imperative and irresistible need which is immediately evident in connection with what are ordinarily called ‘art industries.’ It is easy to show that the same need exists in the case of the other trades. In the workshop, where machines are constructed, the engineer does the planning and calculating; he creates, so to say, the skeleton or frame. But he cannot succeed without the collaboration of a draughtsman, who has added to his natural gifts the manual skill necessary for giving to this frame the material covering which is best suited to each organ, and which at the same time combines the greatest strength with the greatest elegance; his function it is to provide harmony, both of proportion and of the relative position of the different organs, as well as grace of outline and an equilibrium, which is not only real but also apparent, and therefore inspires confidence in spite of the manifestation of strength. In short, such a collaborator must be a man of taste and skill; in other words, an artist. When we stand before his work we award him praise in the expression which involuntarily rises to our lips: ‘what a beautiful machine!’ Every work, indeed, which, owing to the precision with which the ideas are carried out, owing to the harmony of its

Conservatoire des Arts et Métiers.

proportions, and the suitability of structure and form to the quality of material, owing, in short, to its execution, awakens in us the ideas of perfection, is a work of art.

"Such a work is always costly . . . but it is here that industry steps in. By its economical methods of execution, it brings the work of art within reach of the public—not, indeed, without depriving it of its most precious qualities, such as originality, rarity, perfection of execution, and the stamp of the master-mind. But for all that, art industry, that is to say, the industry which seeks the aid of art to make all things more beautiful and more pleasing, whether it be our books, our homes, our dresses and adornments, or our furniture, such industry must be considered as an important factor in national life.

"In France especially is it necessary to encourage the development of this industry . . . for if France cannot manufacture as cheaply (as those nations whose soil is richer in raw material), it can at least manufacture products possessing the attractions of taste."

In the laboratories of this institution some of the professors have, in the presence and with the collaboration of their pupils, made discoveries of the highest value to the world. The Conservatoire possesses eight such laboratories. The specifications of all the patents which have expired are kept in its library. Prior to 1844 the number of such specifications was 12,489, but since that date the Conservatoire has received no less than 165,000. It has been impossible here to do more than give

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a few details of the work of this great institution. A number of prizes and medals are given to attract workmen to its evening classes.

There has in recent years been a good deal of discussion going on in England as to the need of commercial education. New causes in this country, as elsewhere, are always very popular among those persons who have failed to distinguish themselves in the ordinary paths of life. And while, doubtless, they do much to draw the attention of the public to new and pressing needs, they also unfortunately often drown the voices of the men who are competent and willing to guide the nation along the safest path to the satisfaction of these needs. Such has been the case in connection with commercial education. And confusion has been rendered worse confounded by the want of organization in our educational system. In the turbulent chaos where so many rival interests are at work any new educational idea is welcome, as affording a new weapon for partisan strife. The time, therefore, has not yet come for defining the sphere of commercial education in England. Meanwhile, those who are in search of the truth about the matter cannot do better than study the definitions of this important branch of education which are offered by foreign countries.

In the volumes dealing with French technical

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education, prepared for the Paris Exhibition of 1900 by the Ministry of Commerce, such a definition is given. M. Grelley, a distinguished authority on commercial education, to whom was entrusted the preparation of that section of these volumes which deals with the *Écoles Supérieures de Commerce*, thus discusses the matter. He first of all complains that the expression "commercial education" is in itself misleading, for it would seem to suggest that it was possible to *teach* commerce, and that the school could turn out commercial men in much the same way as the universities produce bachelors of art or of science. He disposes of such an idea by pointing out that it would be absolutely impossible to find teachers who were capable of undertaking such a task. He takes as the basis of his definition the one adopted by the Congress on Technical Education held in Paris in 1889. He thus arrives at the following definition :—

"The aim of technical education is the study of the arts and sciences, with a view to their application to commerce." *

He then states the fact that there is no such thing as secondary commercial education. He admits that there may be primary commercial education of the *professional* type; but the only

* "L'Enseignement Commercial a pour objet l'étude des arts et des sciences, en vue de leur application au commerce."

Commercial High Schools.

other branch which he recognizes is that which is based on a sound general secondary education, by preference the full classical course.* In Germany, as well as in France, it is said by many directors of technical high schools, that they find the students who have passed through the classical secondary school stronger in their mental development than those who have received a "modern education." We cannot, therefore, conclude that this preference is to be explained merely by the short-comings of French "modern" secondary education referred to on an earlier page.

The *École Supérieure de Commerce* of Paris, the oldest of these commercial high schools, owes its establishment to private initiative. Opened in 1820, with sixty students, it enjoyed a brief but remarkable success. It was closed two years later, the chief cause of its failure being the impossibility of finding properly qualified teachers. It was, however, restarted shortly afterwards by its original founder, and has endured, with varying fortune, until the present day. It originally bore the title of school of "commerce and industry," and, though the word industry was finally suppressed, the industrial element did not disappear from its programme. The French educationists have always recognized the fact that commerce and industry are interdependent, and that it is as essential that the

* See Table facing p. 170.

Commercial High School of Paris.

commercial man should be familiar with the methods and principles of industry, as that the manufacturer should not be ignorant of the conditions determining the success of commerce. Without tracing its history under the guidance of successive directors—no less than four of whom seem to have been rewarded for their labours with sudden death—we may note one or two important points in the course of its development.

About 1855 the director, Gervais de Caen, a man with remarkable gifts, decided that it was impossible to maintain proper discipline in the school if it received both day-boys and boarders. He therefore determined to make the institution a boarding establishment only. At this time the school was a great financial success. It is stated that in the four years between 1848 and 1852 one of the directors, who was a shareholder in the company which then managed the institution, had made enough money to buy out the other shareholders; the capital of the company at the moment was £10,000. In 1869 the school was purchased by the Paris Chamber of Commerce. The Chamber agreed to pay on the spot to the family of the last director £4800 for furniture, school material, etc., and to lease the building for thirty years at £1000 a year, with option of purchase within five years at £23,000.

At this point the school was divided into three

Commercial High School of Paris.

"counting-houses," as they were called. The first of these provided a preparatory course of one year's duration. The two succeeding "counting-houses" provided a course of a year each, and constituted the really higher commercial section of the institution. In 1876 the Chamber of Commerce decided to offer travelling scholarships of £40 to those of the students who had written the best report on visits made, under the guidance of the director, to certain factories and coal-mines in the North of France. The holder of such a scholarship spent the summer holidays, directly after his third year at the school, studying, in one or more countries of Europe, some commercial question selected by the Chamber.

In 1890 this institution was formally recognized by the State. The other schools similarly recognized, which were founded before 1889, are given in the table on p. 212, which also shows the number of students in the first and second years respectively in 1897.

In the reorganization carried out after 1890 by the Minister of Commerce the division into "counting-houses" was done away with. It was decreed that all the commercial high schools should provide a two years' course of studies, but that they should also have a preparatory course of one year; so that now the divisions are known as the preparatory year and the first and second normal years. In

Commercial High Schools.

the Paris school the preparatory course consists of two sections: one for boys not less than fifteen years old, and the other for foreigners not familiar with the French language and French boys a year younger than those in the former section. All the schools hold a competitive entrance examination for the normal years, though the directors are themselves allowed to admit a certain number of

ÉCOLES SUPÉRIEURES DE COMMERCE

Number of Students at the end of the School Year, 1896-7.

Name of Institution	Founded	Students of the 1st Year	Students of the 2nd Year	Total
École des Hautes Études Commer- ciales, Paris ..	1881	118	128	246
École Supérieure de Commerce, Paris	—	63	43	106
Institut Commer- cial de Paris ...	1884	48	31	79
École Supérieure de Commerce, Bordeaux	1874	60	55	115
École Supérieure de Commerce, Le Havre	1871	40	43	83
École Supérieure de Commerce, Lyon	1872	78	82	160
École Supérieure de Commerce, Marseille	1872	67	57	124

NOTE.—Since 1889 similar schools have been founded in Lille, Rouen, Nancy, and Montpellier.

Commercial High Schools.

pupils. These last cannot, however, obtain certificates or diplomas. Candidates at these examinations must be at least sixteen years old. As is generally the case in France, the examination consists of both an oral and a written part. The following is the list of the subjects in which the candidates are examined, showing the proportion between the marks allotted to each. It is easy to calculate the actual marks which are given, as those which are represented by 1 are allotted 20 marks.

WRITTEN EXAMINATION.

Mathematics—

Arithmetic	3
Geometry	1
Algebra	4

French—

Composition	3
Spelling	1
Writing	1

Modern Language (the candidate is allowed a dictionary)—

Translation from	3
Translation into	1

ORAL EXAMINATION.

Arithmetic	4
Modern Language (Questions on a passage read and conversation)	4
Chemistry	2
Physics	1
History	1

As showing the importance which foreign countries attach to the quality of education, it should

Commercial High Schools.

be observed that as soon as the Ministry of Commerce obtained the right to control these schools, it set about revising their curricula with the aid of experts. It must not be imagined, as is often asserted by those Englishmen who have reasons for objecting to the State-control of education, that the State interfered to bring about absolute uniformity among all these schools; as a matter of fact, but slight changes were introduced into the course of studies which they had planned independently. But at the same time, since their diplomas all carried the same privilege as to military service, it was incumbent on the State to see that in each case the diplomas represented the same standard of acquirements. Neither in France nor in Germany does that complete uniformity exist which is held up to us as one of the inevitable consequences of the State control of schools. If either of these countries ignored expert opinion, as we do in England, and allowed its schools to be directed by government clerks, no doubt all its schools would be hedged in with restrictions destructive of variety or freedom of development. Each of them, however, holds its educational experts in esteem and submits to their influence. The following is the course of studies at the *École Supérieure de Commerce* in Paris:—

Diplomas.

Subjects		Commerce and Book-keeping	Financial Mathematics.	Geometry	First Modern Language	Second Modern Language.	Economic Geography	Commercial, Maritime, and Industrial Law.	Labour Legislation and Political Economy.	Customs and Fiscal Legislation	Commercial History
Hours per week	1st Year	4½	4½	1½	5	3	3	2	—	—	1½
	2nd Year	4	4	—	5	3	3	2	2	1	1½

Subjects		Chemistry, applied to Commerce and Industry	Description of Merchantable Articles and Products.	Technology	Applied Physics	Mechanics	French	Stenography.	Drawing.	Writing	Total.
Hours per week	1st Year	1½	1½	—	1½	—	2	1	1½	2	36
	2nd Year	1½	1½	1	1½	1½	—	—	1½	1	35

There are two grades of diplomas and one certificate, which may be obtained by students who have been through the whole course. The final examination is entirely oral, as is also the examination which must be passed in order to enter the second year of studies. Two points should be noticed in connection with the examinations for the diploma. First, the director of the school and at least one of the professors are

The Examination Test.

members of the Examination Board. Secondly, the diploma is not awarded on the result of the final examination alone.

It has been found in France, as we are at last beginning to discover in England, that an examination held at a given moment, however carefully it be carried out, cannot properly test the standard of acquirements attained by the candidate. It is true that in France, where the majority of schools are inspected by the State, a great deal may be done to check that growth of a "cramming" system which is the not unnatural consequence of the examination test. But it would be surprising, when a boy's or girl's future is made to depend solely on the answers given on a fixed day to either written or oral questions, if parents were not willing to give every encouragement in their power to those enterprising persons who invent ways—generally traversing every scientific law of education, it is true—of preparing their children for the demands of that fateful day, and that day alone. But even supposing that cramming could be suppressed, the French authorities deem it unfair to grant these diplomas on the result of one examination alone. Consequently, in addition to the marks which are obtained at this final examination, those which have been awarded to the student throughout his whole course of studies are counted as

The Examination Test.

part of the final total deciding his right to the diploma.

It is, however, evident that the relative value of marks obtained in the examinations at the end of the first and second years respectively needs careful calculation. And it is, from an English point of view, extraordinary with what care this delicate problem is solved by the French educational experts. The system of marks which they have built up is complicated. For instance, in the final result the marks obtained by the candidate in book-keeping at the intermediate examination are multiplied by 3, and those obtained at the final examination are multiplied by 11. The same precise grading of relative values is worked out for each subject. We may, indeed, learn much from the methodical and scientific manner in which the French have attempted, in this instance, to overcome the inevitable evils of the examination test.

It is certain that this could not have been done unless they had been willing to allow the educational expert to have a decided voice in the matter. We, on the other hand, mistrust him, and prefer that regulations as to examinations should be made, in the vast majority of cases, by those who have had no experience in teaching the class of candidates to be examined. The foreigner must often be astounded when he perceives how

The Examination Test.

implicitly we trust to examinations as a test of every kind of qualification for every possible situation ; for such an instrument as the examination cannot be used with satisfactory results by a people who have so great a faith in the rule of thumb, and who regard with suspicion and resentment any improvements in this instrument which would deprive it of that simplicity that can alone make it intelligible to the "man in the street." Were the State in England to allow the expert to so improve this instrument as to render it capable of testing with scientific accuracy, in other words, were it to attempt to build up such a system of examinations as that just described, it would have to face a storm of protest from the people, who at present do no more than grumble harmlessly at the evils of the existing system. It might, therefore, at a time when we are all deploring the absence of the spirit of method among the British people, be wise to ask ourselves if we are really capable of using the examination test, and if it does not, in fact, do little more than bestow a democratic sanction on the rule of thumb, which is the only scientific deduction that has been made from a long succession of muddles.

One of the privileges carried by the diploma of these commercial schools is the remission of two out of three years of compulsory military service. But the somewhat extraordinary condition is made

French Regulations.

that only the first four-fifths, in order of merit, of the successful candidates are granted this privilege. The remaining fifth obtain a second diploma without the privilege. It is necessary to gain 65 per cent. for the higher diploma. A certificate is given to candidates obtaining not less than 55 per cent. of the maximum marks.

Certain regulations have been made as to attendance at examinations, which show again how impossible it is to form a fair appreciation of foreign education without being thoroughly familiar with foreign life. It was discovered that just before the intermediate examination some of the students absented themselves for a day or two in order to "cram up" at the eleventh hour. Others, who did not feel ready to undergo the written examination, and still less prepared to face the oral test, arrived late on various excuses, and requested to be examined after their fellow-students. A ministerial decree was therefore issued, stating the five excuses which would alone be accepted for such non-appearance. They are—certified illness; death of a relative in the line of direct ascent, or of a brother or sister; attendance at the funeral of an uncle or aunt; attendance at the marriage of a brother, sister, or relative in the line of direct ascent; and appearance for various reasons before the military authorities. There are few English authorities who would

Scholarships.

venture under these circumstances to draw such inflexible lines of demarcation in the sphere of the family affections.

In 1896 the direct maintenance grant of the Government to these schools amounted to no more than £400; since then it has ceased altogether. The Ministry of Commerce, however, gives every year six scholarships to those candidates whose parents cannot afford to pay the whole or part of the school fees. The financial position of the parents of such students must be certified by the mayor of the *commune* in which they reside. A competitive examination is held for these scholarships. Other scholarships are also awarded; in Paris, for instance, seven are provided for day-boarders by the Chamber of Commerce.

The Paris school moved into its new quarters in 1898. The buildings which it now occupies cover 2500 square metres, in addition to a playground which measures 3000 square metres. It now numbers 250 pupils, including both boarders and day-boarders. The total fees for boarders, apart from the cost of books, etc., are about £87 a year. The obligatory fees for day-boarders are about £41. Mr. M. E. Sadler thus describes the new buildings, which he visited in 1897: "This institution comprises a residential section as well as provision for day-students, and also a junior or preparatory department, which is entirely separated from

École des Hautes Études Commerciales

the higher school itself. There is a fine museum of commercial products, an ample and beautiful library, a laboratory, two large lecture-theatres, a number of lecture-rooms, dining-rooms, as well as the dormitories, sanatorium, etc., which belong to the Hall of Residence, as we should perhaps call it in England. All this admirable provision is due to the liberality of the Paris Chamber of Commerce, which has distinguished itself by its devotion to the cause of commercial education."

The *École des Hautes Études Commerciales* is of a slightly higher grade than the above-mentioned institutions. Many people maintain that the difference is not sufficient to justify the two types being classified as distinct grades. It is important, however, to notice that in 1894 the Minister of Commerce decreed that there should be established in this school a normal section for the training of commercial teachers. No candidate is admitted to the competitive entrance examination to this section who is not at least twenty years old. In 1899 there were 383 students in this school, which differs from the *Écoles Supérieures* in that it admits day-students.

Perhaps no country is so well provided as France with universities and educational institutions providing scientific instruction of the highest order, some of which are supported by the Government for the education of those who are to be employed

Tendencies of French Education.

in the service of the State. They fall outside the scope of the present work, in which it is attempted only to give a brief sketch of what is being done for the education of those who are directly engaged in carrying on trade and industry. It is, however, true that a number of students from these institutions find their way into industry ; and, even if it were not so, the influence which these schools exercise directly and indirectly over the development of industry is of the greatest benefit to the nation. Certainly more is done in such French institutions to encourage original research than in our universities.

One can open few modern French books on the subject of education without finding passages in which great emphasis is laid on the need of providing checks on the too common desire to enter what are termed the learned professions. This negative function of education, if it may so be called, has assumed almost greater importance in the eyes of a large number of French educationists than the normal function of the promotion of the best interests of industry or commerce. Judging from the works of contemporary writers on education, one would think that the burning question in France at the present moment was how the school may stop the rapid increase of *dévoys* and *déclassés*. According to them, at any rate, general education—in the sense of the encouragement of

Tendencies of French Education.

natural development, mental, moral, and physical—has failed when universally adopted. Whether the teachers have been at fault they do not say. But this explanation would not certainly be admitted by any foreigner who has had the privilege of seeing the French teachers at work. Probably in no country in the world has the teaching profession attained to such a high standard of skill and to such a pitch of devotion. For his brilliancy of expression, scientific delicacy of touch—if the term may be used—and tenderness of sympathy, the French teacher is unequalled. Neither is he behind those of any other land in his love of country and his admiration of national language and literature. If any teachers could have succeeded in carrying out all that was best in the educational theories of Rousseau, surely it was the French. If they have failed, it is due to the innate and ineradicable characteristics of their pupils. Among these characteristics not the least strongly marked is social ambition—the heritage of that irresistible movement which was to bring about social equality, not on the basis afforded by taking the average between the highest and the lowest, but on the level of the highest. It is owing to this that France has found herself overrun with *déclassés* and *dévoyés*.

The school, then, has to catch those who are inclined to pursue ambitions which they have

Tendencies of French Education.

little chance of satisfying, and put them on the path which leads to contentment. This was most easily and surely achieved by spreading a net of technical education over the primary schools. The educational ladder of which we have heard so much in England had to be broken down, and probably in no country is there now so little connection between the higher and lower branches of education. The teachers, it is true, with to a certain extent the sympathy of the Ministry of Public Instruction, have fought against this movement. And it is to be traced to their influence that the purely educational aim has in any degree been maintained in the higher primary system, and that scholarships have been provided at the secondary schools for those talented children of poor parents who are able to profit from the instruction and education which they offer. But the plutocratic influence, which has always been thrown into the scale against them, has turned the balance in favour of the policy adopted by the Ministry of Commerce. The technical net is ever being widened and strengthened. In its main features the system which is growing up, and in a great measure already exists, may be shortly described as follows. From the primary school those children who are not forced immediately to earn their own living proceed to the higher primary school, with its technical tendencies, or to the practical

Tendencies of French Education.

schools of commerce and industry, which may be regarded as purely technical. From thence, if they continue their education still further, they pass into the *Écoles Nationales d'Arts et Métiers*.

The strife between the technical and the purely educational idea is still being waged around the children of the poorer classes. It may safely be said that this struggle will decide the moral fate, and therefore the material prosperity, of France. It is fortunate for us that social conditions have not yet appeared which give us any cause for spreading the net to catch soaring ambitions. Where it has been done it has not been due to any conscious design. A few earnest educationists in our midst, with a preference for France often to be traced to their ignorance of the German language, have visited the French schools, and not fully appreciating the causes underlying their development, have returned to England to persuade eager authorities to adopt the French line of progress. But the results that have followed cannot last ; for they lack that vital force which can alone be supplied by national needs or irresistible national tendencies.

Before concluding that the French system is the natural outcome of democracy, it is wise to give a thought to what is being done in the schools of that other great exponent of democracy which is more nearly akin to ourselves.

CHAPTER VI.

THE FOUNDATIONS LAID IN AMERICA.

THE great American Republic contains a population half as large again as that of the British Isles spread over an area nearly twenty-five times as great. The different conditions of political and social organization which such a comparison suggests must be borne in mind throughout a study of the American system of education. One other point must not be overlooked. The tie of kinship between the United States and England is undoubtedly strong ; it is true that there are common traits of character to be found in both peoples which must ever influence them, even if with decreasing force, to develop along parallel lines. But we are perhaps inclined in England to overrate the influence of our parentage on this great nation, just as we are inclined to exaggerate its influence on the younger colonies which we have planted. Speaking generally, it cannot be said that traces of our influence predominate in the actual development of American education. The Americans have, of course, a certain natural

American Variety.

power of appreciating what is best in the educational results which we have achieved. But when we have said that they have profited from our experiences, from our successes and our failures, we have probably stated the extent of their indebtedness to us. As far as their actual system is concerned, they probably owe more to other nations than to the English.

There is no national system of education in the United States of America of the kind which exists in Germany and in France ; that is to say, a system controlled and organized by the national Government. The history of the making of the United States would lead us, indeed, to expect to find the greatest possible variety of educational organization. Even the early English colonists represented a number of different social, political, and religious views, all of which manifested themselves in the systems of schools which they founded. Some brought with them the English social prejudices of the time against the education of the lower orders—prejudices which in the mother land, however, did not prevent the man of talent from obtaining his rightful place in the aristocracy of intellect. We accordingly find some of the early colonists refusing to establish public schools. Berkeley, the Governor of Virginia, stated the policy of his colony in this matter in no uncertain or wavering terms.

American Variety.

"I thank God," he said, "that there be no free schools nor printing-presses, and I hope we shall not have them these hundred years ; for learning has brought disobedience and heresy and sects into the world, and printing has divulged them and libels against the best of Governments : God keep us from both."

On the other hand, the general court of Massachusetts passed a school law in 1647 providing that every township "of the number of fifty households shall appoint one within their town to teach all such children as shall resort to him to write and read, whose wages shall be paid either by the parents or masters of such children, or by the inhabitants in general." This law further ordained that any town of one hundred householders "shall set up a grammar school, the master thereof being able to instruct youths so far as they may be fitted for the University." The Dutch colonists also seem to have fully appreciated the value of public education, though at the same time they adopted the undemocratic political organization of their mother-country. From these examples it will be seen that at the very outset the roots of variety were planted in America. But when once a people is possessed by a common national purpose certain limits will inevitably be placed on diversity within its system of education. The common national purpose appeared in America towards the end of the eighteenth century.

Growth of a National Purpose.

Whatever were the causes of the Revolution of 1776—and they are still involved in a certain degree of mystery, which the historian may some day clear away—it was popularly hailed in America as the enfranchisement of the individual, and as the throwing off of oppressive restrictions to economic, social, and religious liberty. But the young nation did not at the outset realize how the democracy which it was building up must depend on education for its proper conduct and success. It was not until some forty years later that Daniel Webster pointed out, in the words quoted on an earlier page,* how education could alone fit a people to rule itself, and arm it with the power to resist that license and corruption which are no less dangerous when fed by liberty than when countenanced by and employed in the service of tyranny. But from this time onward we find a common national purpose pervading all public education in the United States.

It is not a national purpose of the nature of that which we see dominating all others in Germany; it is not directed towards the overcoming of foreign rivalry, for America has not in the past been obliged, like Germany, to fight for her existence against foreign competition; it is rather manifested in a strong determination to make a success of democracy, and to

* See pp. 12 and 13.

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enable the people to realize through self-government the highest possible form of national development. We can, therefore, trace in the educational progress of the past, no less than in that of the present, a determination to undermine the forces of corruption which spring up like tares in the democratic field. No greater testimony has indeed been borne to the power of education than by the bitter strife which has been waged for its control between those endowed with a high moral ideal on the one hand, and those who wish to convert democratic liberty into license for selfish ends on the other. It can only be compared with the struggle between the State and the Catholic Church, which we see at present going on around the schools of France.

American education has at one and the same time benefited and suffered from the democratic principle of self-government. For, if this principle is to be adhered to consistently, the people must be allowed to exercise free control over education, as much as over any other branch of public life which calls for collective action. When, therefore, public authorities have been appointed to provide, maintain, or supervise the schools, they have necessarily been of a popular character. America consequently offers an excellent example of the attempt of a people to educate itself.

It may be immediately asked whether self-

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education can prove a success in the case of nations any more than of individuals. It has been maintained throughout these pages that the work of education consists in guiding the individual towards a definite end in accordance with natural laws. Such education must be carried on by those on whom the individual depends during the period of his infancy. Consequently there are two parties to be considered. The one is in a position of dependence ; the other wields a supreme power, which, however, he can only exercise within the limits imposed by the natural laws of human development. If we consider the question in its collective aspects, as it affects the community, we must inquire in whom is this supreme power to be vested? Logically, and without taking any political considerations into account, the answer will be : in the educators in their collective capacity. In an ideal State this indeed would be possible. Germany has more closely approximated to this ideal than any other nation. But in a democracy liberty is recognized not only as a negative freedom from all oppression, but as a positive freedom, allowed to each member of the community, of making his will felt as a force in the final resultant which decides the national destinies. This is allowed to him because democracy is based on the assumption that such a final resultant is the most absolutely right, and that the

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wills of individuals, directed by the knowledge they enjoy, must, in combination, form an average will which is infallible. Democracy is therefore obliged to admit the sanctity of individual knowledge, and is in its very essence opposed to the controlling influence of the expert.

But since it is impracticable that government should be carried on by the many, democracy is forced to strike a compromise between expediency and the fundamental principle on which it rests. By this compromise the work of government is entrusted to a few individuals; not necessarily those who have risen by their superior ability to a position of supreme power, but those who are most likely to represent the average will. And if representation of the average will is the first consideration, it is evident that the control of no branch of national life will, unless by a mere coincidence, be vested in experts who have proved themselves to possess the greatest knowledge of that branch and to be the most competent to control it. Under such a form of government, consistently carried out, the infants of the nation will depend for their guidance on the average will of the adults. But the delicate machinery which can alone ensure such consistency has never yet been set up, or, if it has, it has immediately broken down under the strain of human passions. In practice the average will has

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invariably been converted into the will of the majority.

America has been no exception to this rule, and probably in no country has the veil been so ruthlessly torn aside from the workings of human passion. In other countries, no doubt, government, of whatever form it has been, has from time to time been captured by those who place selfish interests before the common welfare; but in no country has this been more terribly exposed to the view of all mankind. And thus it has been seen by all observers that the public authorities, which have controlled education, have often represented not the average will, but the feebleness of the weak and the selfishness of the evil combined to form a majority. The former have been unable to appreciate their responsibility with regard to that branch of national life which is, in a sense, the source of all others; they have been ignorant of the very principles on which the proper conduct of education is based. The latter have known too well how education can be used to mould the rising generation to their own ends, and they have acted with a skill which is never wanting to the strength of evil.

It is not intended for a moment to suggest that in all the State authorities and in all the city school boards of America weakness and corruption have been permitted to prevail. That

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they have sometimes had the upper hand cannot be denied ; and that it has been so is, to a very great extent, the reason for the changes witnessed in the organization of public control, changes which have always followed a progressive line towards stronger and better and purer administration. Those who know America best, whether prejudiced in favour of, or without sympathy with, democratic forms of government, seem to be convinced that she is advancing steadily towards the realization of a noble ideal, and the consummation of a union between native strength and moral and æsthetic culture productive of the greatest benefits to the human race.

America has seen that her future depends on her education, which can alone help her to counteract these evil influences. She has perceived it, from different causes it is true, no less clearly than Germany. As education is the source of all other branches of national life, so the teachers are, in a sense, the source of education. It has been the fortune of America to perceive this fact also ; and she has had the wisdom to give more and more power to her teachers. They have responded nobly to the trust which their country has placed in them, and have joined issue with the forces of corruption, gradually driving them back from the positions in which they had entrenched themselves. In short, it may be said

Quality and Quantity.

that the history of the recent development of the American educational system is concerned mainly with the struggle for the control of the schools, between the teachers and the experts on the one side, and the popularly elected representatives of the people on the other.

As we have already seen, the countries which have achieved the greatest results in the promotion of trade and industry through education are those which have attached greater importance to the quality than to the quantity of their education ; those which have not only recognized the fact that education must take account of the other elements besides trade and industry in national prosperity, but which have, at the same time, perceived that the qualities which make the good citizen are precisely those which also make the successful tradesman or manufacturer. It would therefore appear that, in this connection, nothing is to be gained by regarding the practical demands of industry and commerce apart from their natural relation to all the factors in national welfare ; and that, not only in the section of education which is concerned with general development, but in those other branches which are devoted to special training, the general educational aim must not be ignored.

There is, consequently, a twofold reason for entrusting the control of the schools to authorities

Organization of Public Control.

presiding over wide areas. In the first place, there is the reason suggested by economy of effort. If a common purpose must underly all national education, it is a waste of power for a number of small bodies to undertake a task which can be performed at least as well by one body controlling a wide area. In the second place, the necessity of developing and encouraging the perception of the national purpose, of maintaining the supremacy of national interests, tells against the existence of authorities in which narrow local aims must necessarily overshadow all else. We consequently find in America a tendency to centralization in educational control concurrent with the tendency to give greater power to the expert.

At a time when the organization of educational control is rightly occupying so much attention in England, and when this organization is being carried out with every possible concession to democratic principles, it is useful to observe what is being done in this matter by the great democratic Government on the other side of the Atlantic. More particularly, we should consider how far the public control which America has organized for her schools has enabled her to establish firmly the educational foundations of her trade and industry. For with us the great incentive to the creation of new kinds of public control is

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the need for providing better technical and, perhaps, also secondary education; or, to put it in other words, the real stimulus to educational activity is the desire, silent or expressed, to increase, or at least to ensure, our material prosperity.

The most democratic form of educational government is to be found in the American "school district." In the old days of a scattered population, families used to combine to maintain a school which would provide education for their children. The extent of the school district was, therefore, no larger than would permit of all the children attending the same school. Districts have indeed had legal existence which were composed of but one family. The government of the district is vested in all the voters, who meet at least once a year, and had originally full and complete control of the school system. The tendency during the first half of the nineteenth century was to make this thoroughly democratic system more perfect; that of the latter half was towards greater centralization and uniformity. In a number of States the township system has altogether supplanted the district organization.

It is impossible to lay down any general rule as to the organization of educational government in the United States, for almost every possible variety is to be found. All that can be done is to point to

Tendency towards Centralization.

general tendencies which are to be observed, and to the evident approximation towards one type which stands out more and more as the ideal which the whole country is striving, in spite of many obstacles, to attain. In the township system, for instance, we find different ways of electing the body in which the control of the schools is vested. In some it is chosen at annual town meetings ; in others central boards are appointed, the members being chosen by the electors of the sub-districts. But it is to the cities and the States that we must look to see the growth of the system which may gradually absorb all others. Here we may perceive a tendency towards centralization of control and a gradual approximation to one ideal type of organization.

This is not the place to consider the increase and concentration of the population of the United States. It must, however, be noticed, as explaining many of the changes which have taken place in the control of education during the latter half of the last century, that, while in 1790 there was but one American city having between 8000 and 12,000 inhabitants, in 1890 there were 147 cities of this size. In 1890 there were also fourteen cities with a population of from 75,000 to 125,000 ; and now there are at least twelve cities with a population of over 500,000. Conditions such as are suggested by these facts make impracticable those primitive

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forms of government described above. The States have, therefore, interfered and made new laws to meet these conditions.

But when it is said that the States have interfered, it must be added that in the majority of cases it is the cities themselves which have taken the initiative and have drawn up laws which the State has done no more than sanction—a mode of procedure which will recommend itself to the English advocates of local self-government. An advantage or disadvantage of this procedure is that, as a result, there is no one system of educational government common to all American cities. For instance, though the management of the schools is almost invariably vested in a city board, this board is constituted in apparently as many different ways as there are cities. In the majority of cases the boards are *ad hoc* authorities elected by the people; but in many instances they are appointed by the mayor alone or by the mayor and city council jointly. In Philadelphia the board is appointed by the city judges, and in New Orleans by the State board of education. Buffalo forms a unique exception. In the monographs prepared for the American educational exhibit at the Paris Exhibition of 1900 this organization is thus described :—

“In the city of Buffalo, New York State, the school affairs are managed by a committee

Dangers of Democratic Control.

appointed by the city council, but happily this case stands by itself, and the evil consequences possible under such a scheme have been much ameliorated in this particular case for the last half-dozen years by a most excellent superintendent of schools, elected by the people of that city."

This special organization being of particular interest to English people at the present moment, it will be well to give some details as to the nature of the office filled by the superintendent of schools.* But before doing so a few words may be said in explanation of the evil consequences referred to in the above passage. The same authority remarks in connection with the way school affairs have been managed in the larger cities:—

"In the smaller places—even in cities of a hundred thousand or more inhabitants—matters have gone well enough as a general rule, but in the greater cities there have been many and serious complaints of the misuse of funds, of neglect of property, of the appointment of unfit teachers, and of general incapacity, or worse, on the part of the boards. Of course, it is notorious that the public business of American cities has very commonly been badly managed. It would not be true to say that the business of the schools has suffered as seriously as municipal business, but it has certainly been managed badly enough. . . . Men engaged in managing the organizations of the different political parties have undertaken to control appointments in the interests of their party machines. And the downright scoundrels have

* See p. 247.

Autonomy of American States.

infested the school organization in some places for the sake of plunder."

One is prepared, after reading such an indictment, to learn that the powers of these city boards are very great. As a matter of fact, every possible function of control seems to be bestowed on them, from the appointment and promotion of teachers to the purchasing and selecting of new sites for schools. In only a very few cases, however, are they allowed to decide the amount of money which shall be raised for educational purposes.

There is still one other feature which must be dealt with before turning our attention to the superintendents of schools. The public school system of America is now supported entirely by taxation. It therefore depends upon the exercise of a sovereign power. All sovereign powers have not been entrusted to the national Government; some of them are retained by the States. The provision and supervision of schools, for instance, is a function of the State and not of the national Government. The vast extent of the territory under the national Government offers in itself an explanation for the autonomy of the States in educational matters. It is impossible, therefore, to draw any analogy in this respect between the English and the American systems, unless we compare the whole of England with one single State.

Attitude of National Government.

When, therefore, we speak of the centralizing tendencies of American education, the term is used with reference to the State, and not to the general or national Government. Indeed, the general Government exercises no authoritative control over the educational institutions of the nation.* Starting on a purely democratic basis, it held that its right was limited to the encouragement of voluntary or local effort. How far control may be ultimately centred in the national Government nobody can foresee. Many persons may think that the gradual approximation on the part of the States to a common system tends in that direction.

The national Government has, it is true, made grants of land to the different States for educational uses. Two occasions on which these grants were made deserve notice. In the "Ordinance of 1787 for the Government of the North-West Territory," it was provided that: One section of land in each township should be reserved for the support of religion, one section for common schools, and two townships for the support of a "literary institution to be applied to the intended object by the legislature of the State." Accompanying this provision was a declaration that "religion, morality, and knowledge being necessary to good

* The relation of the National Bureau of Education (see p. 243) to the educational system of Alaska may perhaps be considered to offer an exception to this statement.

United States Bureau of Education.

government and the happiness of mankind, schools and the means of education shall for ever be encouraged." In 1862 an Act was passed giving to each State thirty thousand acres of land for each senator and representative to which the State was then entitled, for the purpose of founding "at least one college, where the leading object shall be, without excluding other scientific and practical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the *mechanic arts*, in such manner as the legislature of the States shall respectively prescribe, *in order to promote the liberal education of the industrial classes in the several pursuits and professions of life.*" Certain of the above words are printed in italics as referring particularly to the special object of our study ; they will again occupy our attention on a later page.

But the national Government has adopted yet another and no less effective means of assisting educational progress throughout the land. The United States Bureau of Education corresponds in many respects to the Special Inquiries Branch of our Board of Education. It collects facts as to educational movements in all parts of the world, and "furnishes the fullest information upon every conceivable phase of educational activity to whomsoever would accept it." It thus acts not as a controlling authority, but, in a sense, as the brain

Advantages of Wide Area of Control.

of the collective teaching body of the United States. It is needless to insist further on the influence which the Bureau can, and does, under its present admirable direction, exercise over educational development.

Each State is, however, a central authority, in the English acceptation of the term, to itself ; and it is owing to the increasing similarity between the nature of the control employed by different States that something approaching a common system of schools has arisen in America. Cities, townships, and all subordinate political divisions have been compelled to submit to whatever authority the State sees fit to assert ; for they are powerless to levy taxes for school purposes unless authorized so to do by the State. Moreover, generally speaking, they have not been slow to perceive the benefit of a central authority controlling a wide area. In many cases, for example, the State is able to distribute the sums raised by a general levy in such a way as to aid poor districts which otherwise would be without the money necessary for the support of their schools. In this connection the State of New York may be noticed, where the cities provide more than five hundred thousand dollars yearly for the support of schools in the country districts.

But the benefit of an authority presiding over a wide area is no less evident in connection with

Common Features of Different Systems.

the provision of higher educational institutions, which could not be supported without intolerable extravagance by smaller sections of the country. Such institutions are the Normal Schools, preparing teachers for elementary and secondary schools, maintained by nearly all the States ; and the great State Universities to be found in all the southern and western States. "In ten universities of the North-Central division of States," says the authority already quoted, "there are twenty thousand students in college and professional classes, and the work is of as high grade and of as broad range as in the oldest universities in the country."

The degree and extent of the control exercised by each State has been determined by the measure in which the people have appreciated these benefits, and also by the mere material consideration of the financial needs of the minor political divisions. If one attempts to generalize, all that can be said is that each State now includes provisions in its constitution relating to education ; and that in all of them there is some sort of public educational organization established by law. At the same time there seems to be little doubt that there is a general tendency towards centralization within the State limits. Indeed, the State of New York may be said to have achieved a central organization second to none in the world, and which may ultimately

The State of New York—

prove the model for all other States. It therefore demands a brief explanation.

In the first place, there is a State board of regents responsible for the private academies (see p. 256), controlling partially the public secondary schools, and in charge of all the higher educational institutions. In addition to this authority there is the State superintendent of public instruction, whose office we may now consider.

Reference has already been made to the evils which must arise in any system of schools submitted to a purely democratic form of government. An allusion has also been made to the natural objection of a people who have built up a democracy to the influence of the expert. But, from the very beginning, the better sense of the American people seems to have saved them from this consistent adherence to the weakness, as well as to the strength of democracy. As far back as the beginning of last century, the laws insisted that some test should be applied to the qualifications of persons wishing to teach. Such a test implies a recognition of the expert. Early in the century, superintendents were appointed to perform this and other functions demanding expert knowledge. New York appointed a State superintendent in 1812, and by the middle of the century most of the other States, as well as the towns, cities, and, in the Southern States, the counties,

and its Superintendent of Schools.

had followed suit. While in the old days all that was demanded of the superintendent was that he should examine candidates for the teaching profession, collect statistics, and address meetings on educational subjects, now he is held responsible for the quality of the education provided by different sections of the nation. He may indeed be regarded as the great bulwark against the encroachment of political interests on the domain of national education.

In the State of New York the superintendent seems to combine the powers of a European Minister of Education and an ideal English Consultative Committee. His functions have been summed up as follows.—

“ He apportions the school funds ; he determines the conditions of admission, the courses of work and the employment of teachers, and audits all the accounts of the twelve normal schools of the State ; he has unlimited authority over the examination and certification of teachers ; he regulates the official action of the school commissioners in all of the assembly districts of the State ; he appoints the teachers' institutes, arranges the work, names the instructors, and pays the bills. He determines the boundaries of school districts. He provides schools for the defective classes, and for the seven Indian reservations yet remaining in the State. He may condemn schoolhouses, and require new ones to be built. He may direct new furnishings to be provided. He is a member of the State board of regents, and of the board of trusts of

America and Educational Experts.

Cornell University. He may entertain appeals by any person conceiving himself aggrieved from any order or proceeding of local school officials, determine the practice therein, and make final disposition of the matter in dispute, and his decision cannot be 'called in question in any court or in any other place.'"

The organization of educational government has been dealt with at greater length in the case of the United States of America than in that of either Germany or France. It appears to many careful observers that in England we are at present tending towards a democratic form of educational supervision and control. In no country perhaps is the popular mistrust of the educational expert so deep. This is not the place to consider the religious and social causes which have led to that mistrust. But at a time when we have been forced, by the successful rivalry of those nations who have laid strongly and firmly the educational foundations of trade and industry, to reconsider our educational methods, it would seem more than ever important that we should ask ourselves how far such prejudices can be allowed to militate against the improvement of the quality, as well as the increase of the quantity, of our education. In this respect we have more to learn from America than from any other country. For there we may trace the gradual abandonment of those prejudices from which we are at present suffering. And yet

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this abandonment has not been accompanied by any impairing of what is strongest and best in that democratic spirit which is exercising so great an influence on the destinies of England.

America has looked to education to make democracy a success, and the future will certainly show that she has not looked in vain. But in the interests of democracy itself she has been forced to act with that inconsistency which alone seems to ensure success to human endeavour. The knowledge of the few has been allowed in matters educational to guide the will of the many, and those few have not failed their country in her need. In this respect America has furnished one more instance to establish the fact that has not yet been contradicted by modern history : that where a nation places implicit confidence in her educational experts—that is to say, men and women who have, from love of education itself, devoted their lives to the scientific study and practice of education—they will invariably prove worthy of that confidence. Above all, it is important for us to notice, at the present critical moment in our history, that it is to the educational expert that America has had to appeal for assistance to overcome all the evils which had grown up in her organizations for public educational control—systems which she had built up in obedience to the letter of democracy. It remains

Diversity in Elementary Education.

to be seen what systems of education she has established with the aid of her experts ; and more particularly what are the educational foundations of trade and industry which she has laid.

It has already been stated that there is great diversity in the American system of education. This diversity extends even to the elementary sphere. It is most striking to the European observer in the case of compulsory attendance at the elementary school. There are no less than sixteen States and one Territory which do not make education compulsory, although they all have a fully organized system of free schools. Even where compulsion has been adopted, the period of attendance varies. In the majority of cases it is required between the ages of eight to fourteen. In Maine and Washington, however, it is extended to fifteen ; and to sixteen in New York and five other States. In seven States the lower limit of age is placed at seven, and in one of these the child is required to continue his attendance at school up to the age of sixteen. This does not represent the only variety, for there are all sorts of special conditions with regard to children employed in labour on the one hand, and those growing up in idleness or illiterate on the other. In the year 1898-1899 there were 15,138,715 pupils enrolled in the "common schools" of the United States. The average daily attend-

Education Open to All.

ance was 10,389,407 ; that is to say, 68·6 of the pupils on the school registers.

The National Bureau of Education publishes, among the other very interesting statistics which it has collected, the average number of years of schooling (of 200 days each) that each individual of the population receives, or has received at different dates, taking into account all *public and private* schooling of whatever grade. In 1870, the number of such years was 3·36, in 1890 it was 4·46, in 1897 it was 4·93, and in 1899 it rose to 4·96. But the same calculation, taking into account only the schooling furnished by *public* elementary and secondary schools, that is, the "common schools," gives respectively for the above-mentioned years the figures 2·91, 3·85, 4·39, and 4·43. The fact that the American Bureau combines the attendance at elementary and secondary schools, under the term "common schools," in the above statistics, is significant, as showing that, in the eyes of the American people, secondary education is part of the normal course through which every child should pass. In fact, both are considered as parts of a public system which is crowned by the university ; the elementary schools being those which contain "all pupils in the first eight years of the course of study," and the secondary schools those which contain "pupils in the next four years of the course usually conducted in high schools or academies."

Comparison with French System.

From this fact we are led to conclude that secondary education in the United States is not confined to the select few, as in Germany. And here we are again brought into touch with the spirit of democracy—of pure democracy, we might say, in contrast to the democracy of England and France. Here, indeed, we find the fullest recognition of the equal rights of all men. There is no attempt in America, as in France, to hinder children from passing through the secondary school ; on the contrary, they are encouraged to do so by the provision of free secondary education. It is in the difference of the characters of the French and the Americans, and of the influences which have moulded them, that we find the true explanation of their different view of equality. We have seen that in France social ambitions of a peculiar nature have made a strict adherence to the fundamental principles of democracy possible. Without making invidious comparisons between the characters of these two peoples, it will suffice for our present purpose to observe that in America there is no ambition which may not look forward to its highest possible realization.

As it has been often remarked, in a land where a man may pitch his tent where he pleases at night and awake in the morning to find that he has slept over a gold-mine, there are few dreams of ambition which can surpass

Comparison with French System.

the possibilities of reality. And it is, no doubt, such natural equality of opportunity which has given to the American character much of its sturdy independence and self-reliance, two qualities which characters always acquire when they move in a limitless field of possibilities. And it must be remembered that, though democracy has been unable even in America to do away with class distinctions, the passage from one class to the other has, generally speaking, been kept free and open. This is in a very great measure due to the fact that there have been no old *régimes*, as in France, which a fluctuating minority of the people has always been ready to recall, and which have more than once been re-established to disturb the course of democracy. If further proof were necessary of the fact that it was not purely educational considerations which led to the establishment in France of technical education in the secondary sphere, it is afforded by the refusal of the Americans, who are certainly not a jot behind the French in their appreciation of the benefits of industry and commerce, to sanction any corresponding growth in their system of schools. They, indeed, have gone to the other extreme, and have added to their old secondary schools free public institutions of a similar grade. We are, therefore, again, in the case of America, compelled to take the secondary schools into account in a survey

Early Secondary Schools.

of the educational foundations of trade and industry.

The English colonists, in their natural desire to imitate the mother-country, planted Latin grammar schools on American soil. The first of these schools appears to have been that set up in the town of Boston in 1635. The colony of Virginia had made a similar attempt earlier, which came to nothing owing to the Indian massacre of 1622. And here it may be remarked that there is no greater mistake made by the English people than to regard America as possessing only institutions of mushroom-growth and without traditions. Not only are the roots of her secondary schools planted in a very respectable distance, but she has universities which may almost claim to be venerable. In 1636, for instance, the general court of the colony of Massachusetts voted a gift of four hundred pounds towards the foundation of "a school or college;" and two years later the institution was opened, thanks to the bequest of a nonconforming clergyman of England, named John Harvard, whose name it has borne ever since. In 1701 there was also founded another university in Connecticut, which was renamed in 1718 in gratitude for the gifts of Elihu Yale, of London. Columbia University, founded in 1754, may also be able to boast of some traditions.

The number of secondary schools founded in the

Early Secondary Schools.

seventeenth century was considerable. In the very beginning, we perceive a recognition of what may be termed the duty of the State with regard to the education of the people. The most striking example of this is afforded by the Puritan colony of Massachusetts, which, in 1647, decreed that an elementary school should be maintained in every town of fifty families, and that there should be a grammar school in every town in which the number of families amounted to one hundred. The secondary nature of the grammar school was clearly marked by the provision that it was to educate students for admission to the university. Preparation for the universities seems, indeed, to have been the chief aim of all these old schools. What was demanded by that preparation is suggested by the standard of attainments required for admission to Harvard College at this time. These requirements are summed up as follows :—

“When scholars had so far profited at the grammar school that they could read any classical author into English, and readily make and speak true Latin, and write it in verse as well as prose, and perfectly decline the paradigms of nouns and verbs in the Greek tongue, they were judged capable of admission in Harvard College.”

Consequently, the studies in the grammar school were almost entirely classical. These schools were generally attended by the children of the higher

The Academies.

social class, but, like the corresponding schools in the mother-country, they seem always to have been ready to prepare talented boys of the poorer classes for a university career. Apparently, the grammar schools sank before sectarian differences, and at the dawn of the revolutionary period were replaced by the academies.

In the case of the academies, also, there was at first an absence of originality, or of adaptation to the special needs of America. They seem to have been modelled on the secondary schools established in England by the nonconformists, who were excluded from the grammar schools and universities alike. In the course of studies which they provided and in their general organization they seem to have resembled our grammar schools—a resemblance which can still be traced to-day.

In the reorganization which followed the revolution, much attention was paid to secondary education. A strong desire now sprang up for secondary schools under the exclusive control of the State Government, and not marked by the sectarian character of the majority of the academies. In short, public, in opposition to private, schools were now demanded. Boston took the lead in founding a school of the new type. Taking as its model the High School of Edinburgh, the Massachusetts town established, in 1821, an "English Classical School," to which shortly after it gave the name of

High Schools.

"English High School." The course of study in this school was at first three years in length. The subjects of the curriculum were: English language and literature, mathematics, navigation and surveying, geography, natural philosophy (including astronomy), history, logic, moral and political philosophy. It was not until later, when the course was extended to four years, that Latin and modern languages were taught in this school.

Within the next thirty years a number of high schools sprang up in different parts of the country, and now they are found, with very few exceptions, wherever they are needed. It should be observed that the Boston High School received pupils from the elementary schools, and did not at the outset prepare them for admission to the university. But now such a gap between the secondary and higher institutions is no longer allowed to exist, and the high schools include in their curricula those studies which may be considered as preparatory to university education. Greek alone seems to be regarded with some disfavour by those on whom the high schools depend for their support.

Some of the academies have not been able to survive the competition of the younger secondary schools. Others are now stronger than ever, and new schools of this type have been founded. They occupy very much the same position in the American system as would be filled by our great

High Schools.

public schools in an English system from which they were nominally excluded. The academies are generally boarding-schools, and thus possess advantages not enjoyed by the high schools, which receive day pupils only. A number of the old academies offered co-education, and a great majority of the high schools also teach boys and girls together. In the report for 1896-97 of the National Bureau of Education, it is stated that there were in the whole country 5109 public high schools, with few exceptions supported entirely by public taxation and the proceeds of the school funds, or, in other words, providing free education. The number of boys in these schools was 173,445, and that of girls 235,988. Thirty-five of the high schools admitted boys alone, twenty-six girls only, and the remainder were co-educational. At the same time, it was calculated that there were 2100 private high schools, academies, etc., of which 1212 were co-educational; 351 being for boys only, and 537 for girls. From the same source the information is derived that during the year 1898-99 there were 488,549 pupils in the public secondary schools, and 166,678 in private secondary schools.

As might be expected, there is much diversity in the curricula of the American secondary schools. The centralizing tendencies, referred to on an earlier page, have, however, done much to produce

Curricula of Secondary Schools.

that minimum of uniformity which would seem to be essential to the secondary schools of any country. And there is no doubt that much has been done in the same direction by the excellent supply of educational literature, produced by America for the benefit of the English-speaking world, and above all by the teachers' meetings and congresses, in the organization of which the United States are unsurpassed.

From the three following specimens of curricula which were selected for the enlightenment of educational students at the Paris Exhibition of 1900, it will be seen that the American schools have arrived at a well-balanced course of studies. It is interesting to compare these three typical curricula with those of the Prussian secondary schools (see p. 80, *et seq.*). It is significant that in America, where so much is left to the freedom of popular choice, classical studies seem to be gaining in public favour. But although America has emerged from what may be called the "scientific age," during which she surpassed all other countries in her eagerness to teach the greatest number of sciences in the least number of years, even her classical schools do not ignore the part which is played by science in the environment of the modern man and woman.

Curricula of Secondary Schools.

I.—PHILLIPS' ACADEMY, ANDOVER, MASSACHUSETTS (AN INCORPORATED AND ENDOWED BOARDING ESTABLISHMENT).

	Classical Section				Scientific Course			
	Class IV	Class III	Class II	Class I	Class D.	Class C	Class B	Class A
English ..	4	2	2	Eighteen hours selected from the foregoing subjects, with the addition of Physics, Trigonometry, Mechanical Drawing, and Zoology	4	2	2	Eighteen hours selected from the foregoing subjects, with the addition of Trigonometry, Mechanical Drawing, Zoology, Political Economy, and Physics.
Latin . . .	6	5	5		6	4	(2)	
Greek . . .	—	4	5		—	—	—	
French . .	—	(4)	(1)		—	(4)	(2)	
German .	—	(4)	(1)		—	(4)	(2)	
Algebra ..	2	2	2		2	3	3	
Geometry.	2	—	—		2	3	3	
History ..	—	—	3		—	—	4	
Natural Science.	2	—	—		2	—	—	
Chemistry	—	—	—		—	2	(4)	
Botany . .	—	—	—		—	—	(2)	

NOTE.—The figures in the columns indicate the number of "recitation periods" a week devoted to the several subjects. Figures in parenthesis indicate that the subjects for which they stand are alternative with others in the same column.

Curricula of Secondary Schools.

II.—COURSES RECOMMENDED FOR THE HIGH SCHOOLS OF MINNESOTA BY THE STATE HIGH SCHOOL BOARD.

	(a) Latin Scientific Course.			
	1st Year	2nd Year.	3rd Year.	4th Year.
English	5	5	5	5
Latin	5	5	5	5
Mathematics	5	5	—	5
History	—	5	5	—
Natural Science ..	5	—	5	5

NOTE.—In Latin: First year, Grammar; second year, Caesar; third year, Cicero; fourth year, Virgil. In Mathematics: First year, Algebra; second year, Plane Geometry; fourth year, Solid Geometry and Higher Algebra. In Natural Science: First year, Zoology or Botany; third year, Physics; fourth year, Chemistry.

(b) *Literary Course*. As above, substituting four years of German for Latin.

(c) *Classical Course*. As above, substituting Greek Grammar and Anabasis for equivalents.

(d) *English Course*. As above, substituting for Latin, under prescribed conditions, some of the following subjects. Botany, Physiography, Book-keeping, Civics, History, Political Economy.

III.—COURSE FOR PUBLIC LATIN SCHOOL, BOSTON, MASSACHUSETTS

	Class VI	Class V	Class IV	Class III	Class II.	Class I.
English	3	3	3	3	3	3
Latin	5	5	7 [4]	4	5	4
Greek	—	—	[4]	5	5	5
French .. .	—	—	[3]	3	2	—
German	—	—	—	—	—	5
Arithmetic ..	4 [5]	4	—	—	—	—
Algebra	—	—	4 [3]	3	3	—
Geometry	—	—	—	—	—	4
History	3	3	2	2	2	—
Geography ...	3	3	1	—	—	—
Physics	—	—	—	—	—	4
Gymnastics ...	2	2	—	—	—	—
Military Drill .	—	—	2	2	2	2

No *Cul-de-sac*.

NOTE.—The brackets indicate the arrangement for the Spring Term only. Botany, Physiology, and Hygiene are studied during the Spring Term in the hours assigned to Geography in the table. Objective Geometry is studied in connection with Arithmetic in Classes VI. and V. Plane Geometry is begun in the hours assigned to Algebra in Class II.

It will be seen from the above tables that the Americans insist on a wide and general curriculum in their secondary schools. They appreciate to a greater extent than almost any other people the scientific principles underlying education. Indeed there is no country except Germany where the science of education receives such attention from men of first-rate abilities; and probably during recent years the world owes more to the original research of the Americans in this branch of science than to that of any other people. Recognizing that education must follow the course of natural development, and guide the individual towards the complete and harmonious realization of all his capacities, they are loath to shorten the period of general education in favour of a course of special studies. It has been remarked by one of themselves that they are determined that there shall be no *cul-de-sac* in their educational systems. But there was probably no intention, when using a French word to express what is most to be avoided, to draw attention to the fact that in no system is the *cul-de-sac* so common as in the French. It is to be hoped that America's

General Culture.

determination may be strengthened by the extraordinary success in practical life, of those of her sons and daughters who have received the general culture provided by the secondary school and the university, but who have not on that account considered it in any way degrading to start at the bottom rung of the ladder of life. So far the public high schools have to a great extent been able to resist the popular demand for specialized education; in many cases they have refused to admit commercial subjects to their curricula, or to provide manual training for any other purpose than that of general culture. Special commercial schools in the secondary sphere are generally private ventures, and they have to depend on the support of that section of the community which has but a partial insight into the true meaning of education.

It may, perhaps, be said that the American teachers are more free from conventional restrictions, and more daring in the originality of their experiments, than those of any other country. And, when it is remembered that there is no land in which the right to freedom of development is held so sacred, it will be understood that no time-tables or no statistics can possibly represent the full influence of the secondary schools on American progress. The following table is, however, interesting, as showing the

Statistics.

steady increase in the popularity of literary studies, and the decrease in the popularity of some branches of mathematics and science. This table, which is based on statistics furnished by the National Bureau of Education, includes both public and private secondary schools.

	1889-1890		1893-1894		1897-1898.	
	Number of Students	Per cent to total	Number of Students	Per cent to total	Number of Students	Per cent to total.
Total number of secondary students . . .	297,894	—	407,919	—	554,814	—
Number studying—						
Latin	100,144	33·62	177,898	43·59	274,293	49·44
Greek	12,869	4·32	20,353	4·99	24,994	4·50
French	28,032	9·41	42,072	10·31	58,165	10·45
German	34,208	11·48	52,152	12·78	78,994	14·24
Algebra	127,397	42·77	215,023	52·71	306,755	55·29
Geometry	59,789	20·07	103,054	25·25	147,515	26·59
Trigonometry	—	—	15,500	3·80	15,719	2·83
Physics	63,644	21·36	97,974	24·02	113,650	20·48
Chemistry	28,665	9·62	42,060	10·31	47,448	8·55

It is of course to be expected that, in a country where popular opinion has almost as much influence in educational matters as in England, a tendency will be shown to frame the curricula of secondary schools in some cases with an exaggerated regard for popular favour. We consequently find in some of the American secondary schools commercial departments very similar to those which have been

Commercial Education.

started recently in connection with a few English grammar schools. These courses vary very much, both as to their length and as to what may be called their commercial intensity.

The President of Harvard University remarked in an address at the National Export Exposition of 1899 :—

"The so-called commercial course in an American high school is almost universally a course hopelessly inferior to the other courses, being made up by substituting book-keeping, stenography, type-writing, and commercial arithmetic for some of the language, history, mathematics or science of the classical or English scientific course. This course exists in our public schools because it has for committeemen and parents a practical sound. . . . For the purposes of mental training or of mental power, getting this course is never to be recommended, and it is rare that the slight knowledge of these arts acquired by pupils in the public schools proves to be of much use to them in winning a livelihood."

In 1898, a department of commerce was established in connection with the Central High School in Philadelphia. Here the course covers four years, and is generally considered as the nearest approximation which has yet been achieved in the United States to the ideal type of secondary commercial school. The curriculum of this department given below, showing the numbers of hours per week allotted to each subject, is worthy

Commercial Education.

of careful study. The pupil is fifteen or sixteen years of age before he commences to specialize. It is evident, however, that the course of studies represents a compromise between the educational and the "practical" idea ; and only results can show whether both have not been sacrificed. We may well be inclined to ask what practical or educational benefit can be derived from the study of Latin for the first two years only ; or whether the amount of Greek and Roman history or of modern European history, which can be learnt in one year, is really worth the time that is given to it. And again, can anything more than a smattering of physical geography, botany and zoology be acquired during one year, when these subjects share four hours a week between them ? Such a course as this appears to the Englishman, and still more to the German, to represent all that is most brilliant in the daring pedagogical experiments of the American experts, and at the same time to offer a warning against the democratic tendency to try to "serve both God and Mammon." It is precisely the pedagogical knowledge which is displayed in the organization of this course, and particularly in the selection of subjects for the first year, which makes it, to use a somewhat cant expression, dangerous for those who, having only skimmed the surface of educational science, are always attracted by new ideas.

COMMERCIAL DEPARTMENT OF THE PHILADELPHIA CENTRAL HIGH SCHOOL
CURRICULUM, SHOWING NUMBER OF HOURS PER WEEK ASSIGNED TO EACH SUBJECT.

Subjects of Study.	First Year.	Second Year	Third Year	Fourth Year
I. English	Composition and American literature (4). Latin (4).	History of English literature (4). Latin (3). German (4).	Readings from English literature (4). German (3). French (or Spanish) (4).	Reviews and thesis writing (3). German (3). French (or Spanish) (3).
II. Languages other than English				
III. Mathematics	Algebra (5).	Commercial arithmetic (2). Geometry (3). English history (2).	Modern European history (2). Physics and chemistry (4).	Modern, industrial, and commercial history (3). Industrial chemistry (2).
IV. History	Greek and Roman history (3).	Commercial geography (2). Book-keeping (2).	Political economy (2).	Transportation, banking, and finance (4). Statistics (1). Political science (3). Ethics of business and commercial law (2).
V. Science	Physical geography, and botany and geology (4). Philadelphia and interests (1).	Shorthand (2).		
VI. Economics and political science				
VII. Business technique	Penmanship and business forms (1). Drawing (2).		Office practice (2). Shorthand (2). Observation of business methods (3).	

Commercial Education.

From the statistics of the National Bureau of Education it may be gathered that the number of students in all commercial courses in different kinds of institutions in the year 1897-98 was as follows:—In universities and colleges there were 5869; in normal schools, 5721; in private high schools and academies, 9740; in public high schools, 31,633, and in commercial and business colleges, 70,950. Thus no less than 123,913 individuals were receiving some sort of commercial education in the United States during the year mentioned.

The "commercial colleges," the best known of the institutions which provide this kind of training, really offer nothing more than the preparation necessary for a boy or girl, man or woman, of any age whatever, desiring to obtain employment as a clerk. These schools are consequently of a very elementary order, and cannot rightly be termed educational institutions. They are private undertakings submitted to no public supervision. The tuition fee of the better class commercial college varies from £10 to £40 for a year of ten months.

The business college is seen in its highest development in the Drexel Institute of Art, Science, and Industry in Philadelphia, which is said to be one of the best endowed secondary schools in the United States. Here there is a more specialized

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course than is to be found in the Central High School in the same town.* The department of commerce and finance in this school consists of three special divisions—the course in commerce and finance, the office course, and the evening course. The first of these courses provides what is termed a thorough fundamental training for the activities of business. It includes (1) the production, manufacture, sale, and transportation of articles of commerce; (2) the management of stock companies and corporations; (3) the buying and selling of securities; (4) the importing and exporting of merchandise; (5) the borrowing and lending of money on credit; (6) the advertising of commercial concerns, (7) the keeping of business records. This course covers two years of two terms each. A diploma is granted to those students of the Institute who have completed the whole of this course and passed the necessary examinations.

It is to the universities and colleges of America that we must look for commercial education of the highest kind. It is evident that it is not until the grade of education represented by these institutions is reached that a student is fitted and intellectually competent to acquire a knowledge of those sciences on which commerce must depend for its proper conduct. The secondary school

* See p. 267.

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can, indeed, provide training in such practical subjects as commercial arithmetic, shorthand, and typewriting; it can neglect the future needs of the pupil with regard to his general environment, and encourage a premature development of those special powers which will be exercised by the narrower surroundings of his future calling; but it is not until a broad basis of general knowledge has been laid, and a wide development of intellectual power has been attained, that a young man or woman is capable of studying commerce in the way that it is studied in the commercial university of Leipzig, or as industry is studied in the great German technical high schools. The American colleges and universities have comparatively recently recognized this fact. They have also been led to admit, not without a certain reluctance, that although many of the most successful men of business have passed through the classical courses of study which they offer, yet it is possible for them to furnish a training which is becoming more than ever essential.

In these days, when the competition between nations in the markets of the world has reached a pitch of intensity unknown in former history, the man of business is obliged to act with a promptness and rapidity of decision which call for a knowledge of the many conditions affecting commerce, and which can only result from

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a careful scientific training and a wide survey of human affairs. This training and this knowledge may be provided by the universities better than by any other educational institution; for not only must such training be preceded by the education, and this knowledge be based on the instruction provided by the secondary school, but it is desirable that the man of commerce should not be cut off from all the influences of the high traditions upheld by the universities. This the American universities have perceived. Four of them, the University of Pennsylvania, in Philadelphia, the University of Chicago, the University of California, in Berkeley, and the Columbia University, in the city of New York, are conspicuous for the steps they have taken to furnish suitable courses of higher commercial education.

It was in 1881 that Mr. Joseph Wharton, a manufacturer of Philadelphia, made a large donation to the University of Pennsylvania for the foundation of a higher commercial department. This is only another instance of what American education owes to private munificence. The twenty thousand pounds which Mr. Wharton gave for this purpose were used to establish the school of finance and economy. After ten years' experience it was found necessary to reconstruct and enlarge this new faculty of the university. The course in finance and economy now covers

Commercial Course of a University.

four years, thus corresponding to the other courses in arts and science. The conditions of admission are the same as to other courses of the university. The following curriculum shows better than any other form of statement the kind of instruction which is given in the four different years. It should be noted that special provision is made in this course for those students who intend to enter the journalistic profession.

COURSE IN FINANCE AND ECONOMY.

FRESHMAN CLASS.

Subjects	No. of Hours per Week	
	1st Term	2nd Term.
Composition	2	2
Algebra	2	2
Solid Geometry	2	—
Trigonometry	—	2
General Chemistry*	4	4
German	3	3
Accounting	3	3
Physical and Economic Geography	2	2
Practical Economic Problems	3	3
Economic Literature	2	2
Newspaper Practice†	1	1

* For students who present Solid Geometry and Plane Geometry and Physics for admission to College. Such students omit Solid Geometry and Trigonometry.

† For students in Journalism, who omit Accounting in second term.

Commercial Course of a University.

SOPHOMORE CLASS.

Subjects.	No. of Hours per Week.	
	1st Term	2nd Term.
Modern Novelists	2	—
History of English Literature	—	2
Scientific German	3	3
Business Law	2	—
Money and Banking	—	2
Business Practice	1	1
American History	2	2
Roman History	2	2
Theory and Geography of Commerce	2	2
Elementary Sociology	2	2
General Politics	2	2
Congress	1	1
Newspaper Practice *	1	1
Current Topics	1	1

SENIOR CLASS.

Subjects.	No. of Hours per Week	
	1st Term	2nd Term.
Public Administration	2	2
Legal Institutions	2	2
Municipal Government	2	2
Political Economy	2	2
Statistics	2	2
Finance	2	2
Transportation	2	2
History of Renaissance and Reformation	2	2
Art and History of Newspaper-making †	1	1
Newspaper Practice †	1	1
Current Topics †	1	1

* For students in Journalism, who omit Business Practice and History and Geography of Commerce in second term.

† For students in Journalism, who omit Municipal Government, or Transportation, or Statistics.

Universities and Technical Education.

JUNIOR CLASS.

Subjects	No of Hours per Week.	
	1st Term	2nd Term.
Constitution of United States	2	—
Constitutions of Germany and Switzerland	—	2
Congress	1	1
Modern Legislative Problems	2	2
Political Economy	3	3
Advanced Sociology	2	2
Sociological Field Work	1	1
Business Practice	2	—
Banking	—	2
American History	2	2
English Constitutional History. . . .	2	2
Logic	2	—
Ethics	—	2
Art and History of Newspaper-making *	1	1
Newspaper Practice*.....	1	1
Current Topics*.....	1	1

The Universities in America have thus begun to fulfill their duty with regard to the men of commerce, and in this they are being followed by the newer English universities. There is a further resemblance between the two in the attempts which they make to provide that advanced scientific training which we have seen is given by the German technical high schools, and to which Germany owes so much of her industrial prosperity. It may be that in the future England and America will succeed in

* For students in Journalism, who omit either Modern Legislative Problems, or Business Practice and Banking.

The American University.

furnishing better foundations of trade and industry than even the German Empire; for certainly much is to be gained in recognizing at the outset the common link which unites all studies of university rank, whether they prepare for the learned professions in particular, or for the special occupations of trade and industry. But at present America has so far outstripped England in this respect that we can hardly regard the two countries as competing on an equal footing with the educational activities of Germany. Before considering the technical branches of the American universities a few words may be said as to the general organization of these institutions

There is, perhaps, rather less variety in the organization of American universities than in that of the secondary schools. It is, however, exceedingly difficult to institute a comparison between the English and American universities. This difficulty is in part due to the American confusion of nomenclature. The term college, for instance, is sometimes applied to institutions of the highest possible grade, but more generally it connotes a composite organization, partly a secondary school and partly a university. If one could imagine the University of Oxford or Cambridge insisting that all students on arriving at the university should spend four years, before commencing their university studies, in bringing their attainments

The American University.

of scholarship up to the level demanded by the French Baccalauréat, or, adopting Matthew Arnold's comparison of standards,* by the certificate of maturity of a Prussian higher secondary school, then there would be something in England corresponding to the American college. Generally speaking it may be said that, while the universities sometimes contain both a collegiate or undergraduate and a graduate department, the university proper provides only courses of post-graduate studies. Again, it may be said that the American university often contains four departments which resemble respectively the German university, technical high school, agricultural college and gymnasium. Harvard University, for instance, presents the following organization :—

I. Faculty of arts and sciences.

(a) Harvard College, leading to the degree of bachelor of arts.

(b) The Lawrence scientific school (degree of bachelor of science).

(c) The graduate school (degrees of master of arts, master of science, doctor of philosophy and doctor of science).

* "The examination for the degree of bachelor of arts, which we place at the end of our three years' university course, is merely the *Abiturienten* examen of Germany, the *épreuve du Baccalauréat* of France, placed in both of these countries at the entrance to university studies instead of, as with us, at their close."

Harvard and Yale.

II. The divinity school (degree of bachelor of divinity).

III. The law school (degree of bachelor of laws).

IV. The medical school (degree of doctor of medicine).

V. The dental school (degree of doctor of dental medicine).

VI. The school of veterinary medicine (degree of doctor of veterinary medicine).

VII. The Bussey institution (degree of bachelor of agricultural science).

The graduate school of Harvard does not offer advanced technical instruction in civil and mechanical engineering; this is, however, to be found at Yale, the next oldest university, and in a number of the later universities. Without entering into details as to all the universities* of America, we may notice that in each of twenty-nine of the States there exists a "State university," supported exclusively, or in great part, from public funds, and consequently more or less under public control. Reference has already been made to the grant of land of the General Government in 1862, and also to the condition accompanying these grants, namely, that the leading object of the institutions they maintain should be instruction

* The University of the State of New York is, it should be noticed, an institution analogous to Napoleon's "University of France" (cf. p. 154).

Cornell.

in those branches of learning relating to agricultural and mechanical arts, including military tactics, and not excluding other scientific and classical studies. Before considering the effect of this condition, it may be noted that the other sources of income for the State universities are taxation, tuition fees (in some only of the universities, in many the instruction is entirely gratuitous), and private gifts and endowments. With regard to the last source of revenue, it is not perhaps as large as is generally imagined in England, where we are inclined to be dazzled by the magnificent examples which come under our notice.

Almost all the universities in the United States, including the State universities, offer courses in pure or applied science. What Cornell University, in the State of New York, does in this respect is particularly interesting. Ezra Cornell, to whom the foundation of this university is due, desired to found "an institution where any person might find instruction in any study." Thanks to his generous gift, and his careful management of the funds derived under the Land Grant Act referred to, the college has already realized upwards of £820,000 as endowment, and still holds 156,000 acres of the land originally bought by Cornell, valued at £120,000. These funds may not be sufficient for the achievement of Cornell's object, but they will go some way towards realizing it.

Higher Technical Education.

The Sibley College of Mechanical Engineering, which forms part of Cornell University, was founded by Hiram Sibley, who was interested in some of the great telegraph, railway, and farming enterprises of the middle of the nineteenth century. His first gift provided a building and a chair of "practical mechanics and machine construction." Altogether the gifts of Sibley and his family amount to £46,000. The Sibley College now consists of eight departments—mechanical engineering, experimental engineering, electrical engineering, machine design, mechanic arts or shop work, industrial drawing and art, and graduate schools of marine engineering and naval architecture, and of railway and mechanical engineering. The courses of study cover four years, leading respectively to the degrees of mechanical engineer, electrical engineer, etc. The number of students in 1899 was 492. At the same university there is a college of civil engineering, in which special instruction is given in bridge engineering, railroad engineering, sanitary, municipal, hydraulic, and geodetic engineering. In this splendidly equipped college there were 186 students in 1899.

But higher technical instruction is not found only in the universities. For instance, the first school of science established in America owed its origin to Stephen Van Rensselaer, a Dutchman.

Massachusetts Institute of Technology.

Van Rensselaer conceived the idea of a canal connecting the Hudson River with the great lakes. Having caused a geological survey to be made in connection with this project by Professor Amos Eaton, he was struck with the lack of men capable of conducting such undertakings, and was convinced of the necessity for scientific and technical education. Professor Eaton seems to have been a typical American genius, and it was with his aid that Van Rensselaer founded in 1824 the famous Polytechnic Institute which still bears his name.

An Irishman, Dr. Patrick K. Rogers, was chiefly responsible for the foundation, in 1861, of the great Massachusetts Institute of Technology, now one of the most famous technical institutes in the world. Speaking of this school, Mr. J. H. Reynolds remarks—

“Certainly its wealth of engineering equipment, the thoroughness of its courses of instruction, the practical character of its methods, the high standard which it achieves, well warrant the praise accorded to it, and well sustain its claim to recognition as one of the largest and best appointed scientific and technical schools in the United States, both in respect of staff and equipment. It was opened in 1865 with twenty-seven students, which number had grown in 1895 to 1183, taught by a staff of 137 teachers. Its students are drawn from every State of the union, and from nineteen foreign countries, and included amongst its students are seventy or eighty graduates of

Massachusetts Institute of Technology.

other colleges and scientific schools who come to take technical courses."

The most important section of this institute is a school of industrial science, "devoted to the investigation and teaching of science as applied to the various engineering professions, namely, civil, mechanical, mining, electrical, chemical, and sanitary engineering, and naval architecture, as well as to architecture, chemistry, metallurgy, biology, physics, and geology." The institute offers thirteen distinct courses, each of four years' duration. Affiliated to it is the Lowell school of practical design, providing a course of three years of instruction in the art of design, including technical manipulations, original designs, etc.

There are a number of similar institutions in all parts of the country, which cannot even be named here. It will be found, however, that, in most cases, they provide a course of four years, the first two of which are devoted to general preparatory studies for the special professional work of the last two. This preparatory course usually includes modern languages and those subjects which are necessary in common to every branch of special industrial studies. Nearly all these schools offer a degree at the end of the course ; but while some grant only the degree of bachelor of science, others bestow a more distinctly professional title on their successful students, such as

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civil engineer, etc. Some offer still higher degrees, demanding longer courses of studies, a thesis, and three years' successful professional practice.

There is no common requirement for admission to these schools such as we have seen is demanded in Germany. From an attempt, made by the President of the Worcester Technological Institute, to determine the typical *average* requirement for admission to schools of science or engineering colleges, we learn that they would include, in addition to the "common English branches," algebra, plane geometry, English literature, history of the United States, and either the French or German language. About two or three years' study of the latter would be required, and to this list will often be added solid geometry, plane trigonometry, the elements of physics or chemistry, and sometimes a year or two of Latin.

There is also a large supply of what is commonly understood in England by the term "technical education," that is to say, special preparation, based on elementary education, for different trades and industries. Trade schools, schools of design, and textile schools, of every possible variety, and owing their origin to voluntary effort, are to be found distributed over the land. In all these schools, however, the educational, as distinguished from the professional, aim is never lost sight of. It says much for the educational sense of the

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country that, almost invariably, the technical schools have to satisfy public opinion that the course of studies which they provide is calculated to promote mental, moral, and intellectual development, as well as mere wage-earning capacity. Not the least remarkable among such institutions are the Manual Training Schools. The type which they represent cannot be said to exist in England.

The Manual Training Schools are not technical schools, in the sense that they aim at teaching or even preparing for special trades or professions. "It is really," says Mr. J. H. Reynolds, "the principle and practice of the Kindergarten, concerning the value and necessity of which there is no longer any question amongst American educationists, carried forward through the later years of school life. It is 'learning by doing,' and is fast becoming a recognized principle in school methods throughout the States." It appears, indeed, that this form of education is not based on any utilitarian ideas. We find little trace of that desire which we find nearer home to employ educational principles in excuse of systems which have been built up for purely utilitarian purposes. The Manual Training Schools of America are an attempt to prove that "learning by doing" is the best means of promoting natural development. Their influence has been

Manual Training Schools.

great, and, thanks to their example, there are now few secondary schools which do not devote some time to manual training and also to industrial drawing. The latter study has been defined by an American as "an orderly progressive course of drawing, based on geometry." As showing the increase of manual training in the schools of America, the following figures, taken from the statistics of the National Bureau of Education, are instructive:—In 1890 reports were given of 37 cities; in 1894, of 93 cities; in 1896, of 121 cities; and in 1898, of 146 cities in the schools of which manual training was taught.

Some of these Manual Training Schools form departments of institutes embracing wider general aims. In the Pratt Institute, Brooklyn—another of the American institutions which owes its origin to individual munificence and enterprise—the Manual Training High School forms but one of the four sections of educational provision. The work of this institute has been classified as follows:—

1st. Education, pure and simple, in the Manual Training High School.

2nd. Normal training in preparing a student to become a teacher (*a*) in the department of Fine Arts, (*b*) the department of Domestic Art and Science, (*c*) in the department of Science and Technology, (*d*) in the department of Kindergarten.

Manual Training Schools.

3rd. Technical or special training to secure practical skill and knowledge in the Industrial and Domestic Arts.

4th. Opportunities of acquiring a knowledge of, and direction in, special subjects relating to domestic, social, financial, and philanthropic interests.

A full description of this institute will be found in the report presented by Mr. J. H. Reynolds to the Technical Instruction Committee of the city of Manchester, embodying an account of his visit in April and May, 1898, to technical colleges, institutions, schools, libraries, museums and works in the United States and Canada. In this report we have a survey of the great movement in the *United States for the promotion of industry through education*. It places us under a further debt of gratitude to the city of Manchester. It should be read by all those who are interested in the progress of the great Western democracy.

CHAPTER VII.

CONCLUSIONS.

IN the preceding pages an attempt has been made to show that our foremost rivals in the markets of the world have built up national systems of education, in which full allowance has been made for the claims of industry and commerce. We have probably as many schools as any country, and no doubt our educational expenditure from all sources is equal to that of any of the three peoples with whom we have dealt; but with us there is a total absence of that common purpose which can alone create a system out of a number of independent efforts, and in no sense of the word can we be said to possess a national system of education.

Germany is the country which presents to our view the best organized of educational systems; a national system in the highest sense of the term, since it was created in response to the needs of a nation which was brought to its knees before foreign rivalry. This system was designed in no narrow

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or one-sided spirit, for on it was seen to depend the upraising of the whole nation, and its future development in every branch of human activity on which man may depend for his existence, his comfort, and his happiness. Prussia, with that central guidance and supervision which can alone ensure a common aim throughout the whole system, has been able to insist on the due recognition in every kind of school of the scientific principles underlying education ; and she has been in a position, thanks to her achievements in the interests of the whole Empire, to offer an example to the other German States, who have imitated what was best in her school organization. Taking a wide and general view of the schools of Germany, the impression forces itself upon the mind that there is less special education than in any other country ; that the object of Germany has rather been, so to develop each man that he may be ready to perform, to the utmost of his ability, those duties which his country demands of him. And thus he is not, in the first place, a chemist, a manufacturer or a tradesman ; but a German and a man, who in both capacities has reached the highest point of development of which he is capable. His general education may have ceased at the age of fourteen, when he left the primary school, or it may have been continued until the age of sixteen or nineteen in the secondary school. In the former case, as far as it is possible

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for any political organization to adapt itself to natural conditions, the cessation of his general education coincided with the close of the period of his natural infancy, and of that development which demands the guidance of other men of superior experience and knowledge. In the latter case, with again the same reservation, he showed himself fit to continue his general education to a later age—fit, that is to say, in the sense that his natural development had not ceased at the earlier age of less gifted men. All the leaders in different branches of German national life, therefore, pass through the secondary school, which provides, in the strictest sense of the term, general education. It was owing to this fact that Bismarck was able to say in 1895—

“If I had not found in our nation the preparatory work of the secondary teaching profession, I do not believe that my work, or the work in which I have collaborated, would have met with such success.”

In France we also see a national system of education at work. Here, however, the national purpose has not been so clearly perceived as in Germany. In spite of the teachings of the Revolution, or perhaps because of its teaching, France has found it necessary to impose restrictions on the natural development of man as man. She has been obliged to spread a net of technical education

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over her primary schools to prevent the soaring social ambitions from wandering aimlessly in "secondary" regions. Fortunately, she has allowed free expression to the opinion of her experts, and they have been able to check in some measure the tendency to incorporate education in the great institution which is being built up around the worship of the goddess of Work, the modern substitute for the revolutionary goddess of Reason.

America has also a national system of schools, existing side by side with a multitude of more or less independent efforts. Here the pure spirit of democracy has been so far maintained that the rights of man to the fullest and freest natural development are still held sacred by all but the feeble and corrupt. Around the principle of general, as opposed to specialized, education a bitter struggle is, however, being waged between those who have only the interests of the nation at heart, and those who are ready to use democratic freedom for the promotion of their own selfish interests.

More and more in the United States the control of education seems to be centred in the expert, and it would appear that, to save the schools from the selfish, weak, and corrupt, greater centralization of control will become necessary. Already in the State of New York we find that private schools outside the national system are brought under the control of the State, which is almost entirely vested

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in an educational expert. Whether this example will be followed by the rest of America, it is difficult to say ; but there certainly seems to be a tendency in that direction. And if ever the time should come when external opposition should deprive this great country of the luxury of free experiment ; if ever it should become necessary for her to consider economy in the maintenance of her schools, we shall certainly see a closer approximation to the German system.

Meanwhile the American national system—and there appear to be no reasons for refusing this title to that aggregate of schools of different kinds under public control—in many ways strongly resembles that of Germany. General education until the end of the secondary course is the rule, and not the exception. From the secondary school the pupil proceeds to the technical school or to the university. In three particulars, however, does the American national system differ from the German. First, in its large provision of free secondary and university education ; secondly, in its recognition of the equal rights of both sexes to the same educational opportunities ; and, thirdly, in the close connection existing between the universities and technical schools. In Germany technical schools have been built up independently of the universities, though it is true that they have caught more and more of the university spirit, and adopted

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more and more of the university organization. In America, on the other hand, almost all the universities include, on an equal footing with their other courses, courses of technical instruction of the highest kind.

So far, England, with a fatal gift of imitation which she seems recently to have acquired, has followed, from no natural reasons, the French rather than the German or American development of national education. And, as she obstinately refuses to allow that influence to the expert which France does not hesitate to permit him, there is no saying to what extent she may in the near future violate every sound educational principle. Those who are most anxious as to our future industrial and commercial prosperity fear that England may altogether fail to lay the proper educational foundations of trade and industry. In France and Germany the main support of these foundations is the general education—both classical and modern—provided by the secondary schools. Both of these countries have placed their secondary schools under public control. We are about to follow their example in this particular. But we should at least take warning from America, who, starting long ago at the point which we have now reached, has been compelled to abandon one of the fundamental principles of democratic government, and call the expert to her aid in her struggle against

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the weakness, ignorance, and corruption of those bodies to whom she had entrusted the control of her schools.

There is, however, but little comfort in a warning which does not at the same time point to a way of escape. If we are to avoid the dangers which have threatened the schools of America, it is evident that, in spite of all the scoffs and gibes at the disagreement among experts of all kinds, we must not attempt to solve the problems which now face us without the aid of those who have devoted their lives to the study and practice of education. The government clerk and the county councillor are essential to our educational government, but, whatever may be their functions, we have no right to demand of them a knowledge of the sciences which must determine the nature and quality of the education furnished by every school. One of our first duties, therefore, is to find the experts. Unfortunately, those who in the past have exercised whatever control of our schools has been vested in the government have discouraged the study of the science of education among our secondary school teachers. And consequently there is now a lamentable want of experts to advise us as to the type of secondary school which will meet the needs that are pressing so urgently upon us.

When Prussia, a hundred years ago, gathered herself together for a final struggle against the

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oppression of foreign tyranny, one of the first things she did was to make provision for the training of the teachers in her secondary schools. She thus procured for herself that magnificent army of educational experts which forms one of the chief sources of her national strength. Now that we have to fight against the world to try and maintain our industrial and commercial supremacy, we might do worse than follow the example of Germany, and lay the first educational foundations of trade and industry and of all national prosperity by training our secondary teachers. If we refuse to do this it will be useless to organize our secondary education, as Matthew Arnold so strongly and so wisely urged us to do many years ago, and we may, at no very distant date, find ourselves compelled to begin to train our educational experts by the same necessity as Germany.

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~~THE END.~~

